



Archaeological Resources
Airport Vicinity Development Checklist
Parking Study
Trip Generation Comparison
Parking Master Plan



TRAFFIC IMPACT ANALYSIS

CONTINENTAL MIXED USE

CONTINENTAL DRIVE/SCOTTSDALE ROAD

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PREPARED FOR

SYNECTIC DESIGN INCORPORATED

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Table of Contents

Executive Summary	3
Project Description	5
Study Methodology	5
Existing Conditions	8
Existing Traffic Data	8
Access	10
Trip Generation	13
Trip Distribution & Assignment	14
Existing Traffic Operations	14
Future Traffic Operations Without Project	18
Future Traffic Operations With Project	20
Turn Lane Analysis	22
Crash Analysis	24
Mitigation	25
Conclusion	25

Table of Figures

Figure 1 – Vicinity Map	6
Figure 2 – Site Plan	7
Figure 3 – Existing Lane Configurations and Traffic Control	9
Figure 4 – Existing Weekday Peak Hour Traffic Volumes	11
Figure 5 – Study Configuration and Access Spacing	12
Figure 6 – Weekday Peak Hour Trip Distribution	15
Figure 7 – Weekday Peak Hour Trip Assignment	16
Figure 8 – 2019 Weekday Peak Hour Traffic Volumes Without Project	19
Figure 9 – 2019 Weekday Peak Hour Traffic Volumes With Project	21
Figure 10 – Proposed Lane Configurations	27



List of Tables

Table 1 – Weekday Project Site Generated Trips Using ITE Trip Generation	13
Table 2 – Existing vs. Proposed Trip Generation Comparison	14
Table 3 - Level of Service Criteria – Signalized Intersections	17
Table 4 – Level of Service Criteria – Un-signalized Intersections	17
Table 5 – Existing Weekday Peak Hour Levels of Service	18
Table 6 – 2019 Weekday Peak Hour Levels of Service Without Project	20
Table 7 – 2019 Weekday Peak Hour Levels of Service With Project	22
Table 8 – Turn Lane Warrants	23
Table 9 – Calculated Queue Lengths	23
Table 10 – Crash Analysis at Continental Drive/Scottsdale Road	24

Appendix

Traffic Counts
Trip Generation Calculations
Capacity Calculations
Turn Lane Calculations
Crash Data
Comment Resolution

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TRAFFIC IMPACT ANALYSIS CONTINENTAL MIXED USE CONTINENTAL DRIVE/SCOTTSDALE ROAD

Executive Summary

The purpose of this traffic study is to evaluate the current and future transportation system within the project study area surrounding the site without and with the proposed Continental Mixed Use project.

Existing and Future Traffic Data Without Project

All of the study intersections currently operate at adequate levels of service and are expected to continue doing so in 2019 without the project.

Future Traffic Data With Project

The proposed intersection of North Access/Scottsdale Road is anticipated to experience delays for the eastbound left turning movement in the weekday PM peak hour in 2019 with traffic from the Continental Mixed Use project. This delay is due to the large northbound and southbound through volumes on Scottsdale Road providing an inadequate number of acceptable gaps for vehicles turning from the minor approach.

Un-signalized minor street intersections along four or more lane, major streets such as Scottsdale Road, tend to have their left turn movements from the minor street operate at LOS E or F during the peak hours.

The remaining study intersections are expected to operate at adequate levels of service with the inclusion of the traffic generated by the Continental Mixed Use site in 2019 with the project.

Turn Lane Analysis

A southbound right turn lane is warranted at the intersection of North Access/Scottsdale Road and requires a minimum of 50 feet of storage.

A minimum throat distance of 25 feet should be provided for the eastbound approach to the intersection of North Access/Scottsdale Road to accommodate left turning vehicles.

Crash Analysis

A review of the crash data shows that nearly 30% of all crashes at the intersection were rear-end type. This can be attributed to large traffic volumes along Scottsdale Road combined with the presence of a traffic signal. Delays at the intersection of Continental Drive/Scottsdale Road may cause drivers to rush through the intersection, triggering rear-end crashes.



Mitigation

Mitigation measures to address the eastbound left turn delay expected along North Access at Scottsdale Road are limited. However, it is anticipated that vehicles within the Continental Mixed Use site that intend to travel northbound along Scottsdale Road will avoid the excessive delays at the intersection of North Access/Scottsdale Road and choose to travel to the intersection of Continental Drive/Scottsdale Road via West Access or Circle K Driveway to complete their eastbound left turn movement at the existing traffic signal.

Recommendations

It is recommended that the southbound right turn lane along Scottsdale Road at North Access be constructed with 100 feet of storage to meet the minimum right turn storage length for the City of Scottsdale.

The intersection of North Access/Scottsdale Road should be constructed to provide a minimum of 25 feet of storage for eastbound left turning vehicles.



TRAFFIC IMPACT ANALYSIS CONTINENTAL MIXED USE CONTINENTAL DRIVE/SCOTTSDALE ROAD

Project Description

EJG Investments, LLC has proposed to redevelop the northwest corner of Continental Drive/Scottsdale Road in Scottsdale, Arizona. The proposed development will replace the existing Kia Automobile Dealership with a Planned Unit Development (PUD) that includes 282 units of multi-family housing and 12,507 square feet of variety retail space. The vicinity of the project is shown in **Figure 1**. The site is located as shown in **Figure 2**. It is expected that the project will be completed by the year 2019. Access to the project site will be from three proposed driveways.

The purpose of this traffic impact analysis is to:

- Evaluate the current and future operational characteristics of the adjacent roadway network surrounding the project site.
- Estimate the traffic generation associated with the project and assign that traffic to the existing roadway system.
- Analyze future traffic operations at the existing intersections of Circle K Driveway/Continental Drive and Continental Drive/Scottsdale Road and proposed intersections of North Access/Scottsdale Road and West Access/Continental Drive.
- Determine the need for auxiliary lanes at the three access points directly serving the site.
- Perform a crash analysis to identify any specific crash trends within the study area.

The author of this report is a registered Professional Engineer (Civil) in the State of Arizona having specific expertise and experience in the preparation of traffic impact analyses.

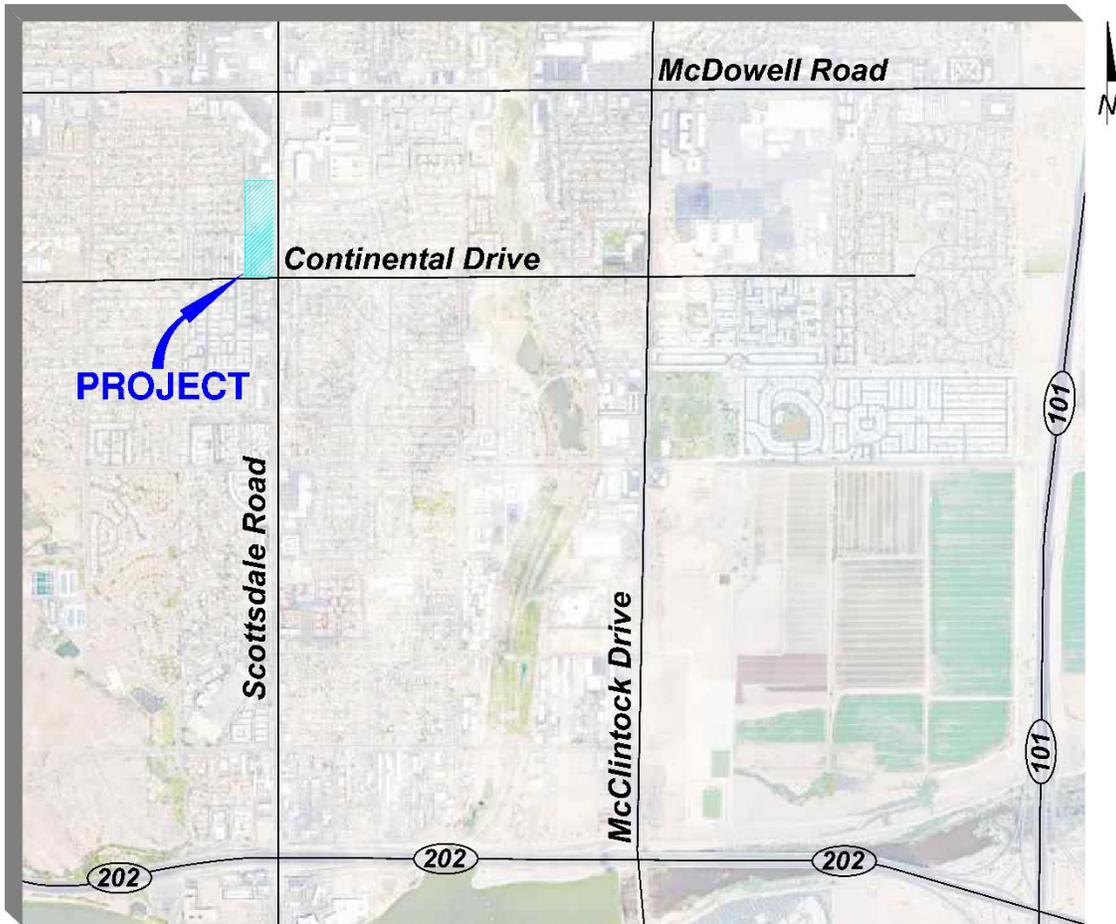
Study Methodology

In order to analyze and evaluate the potential traffic impacts of the proposed development, the following tasks were undertaken:

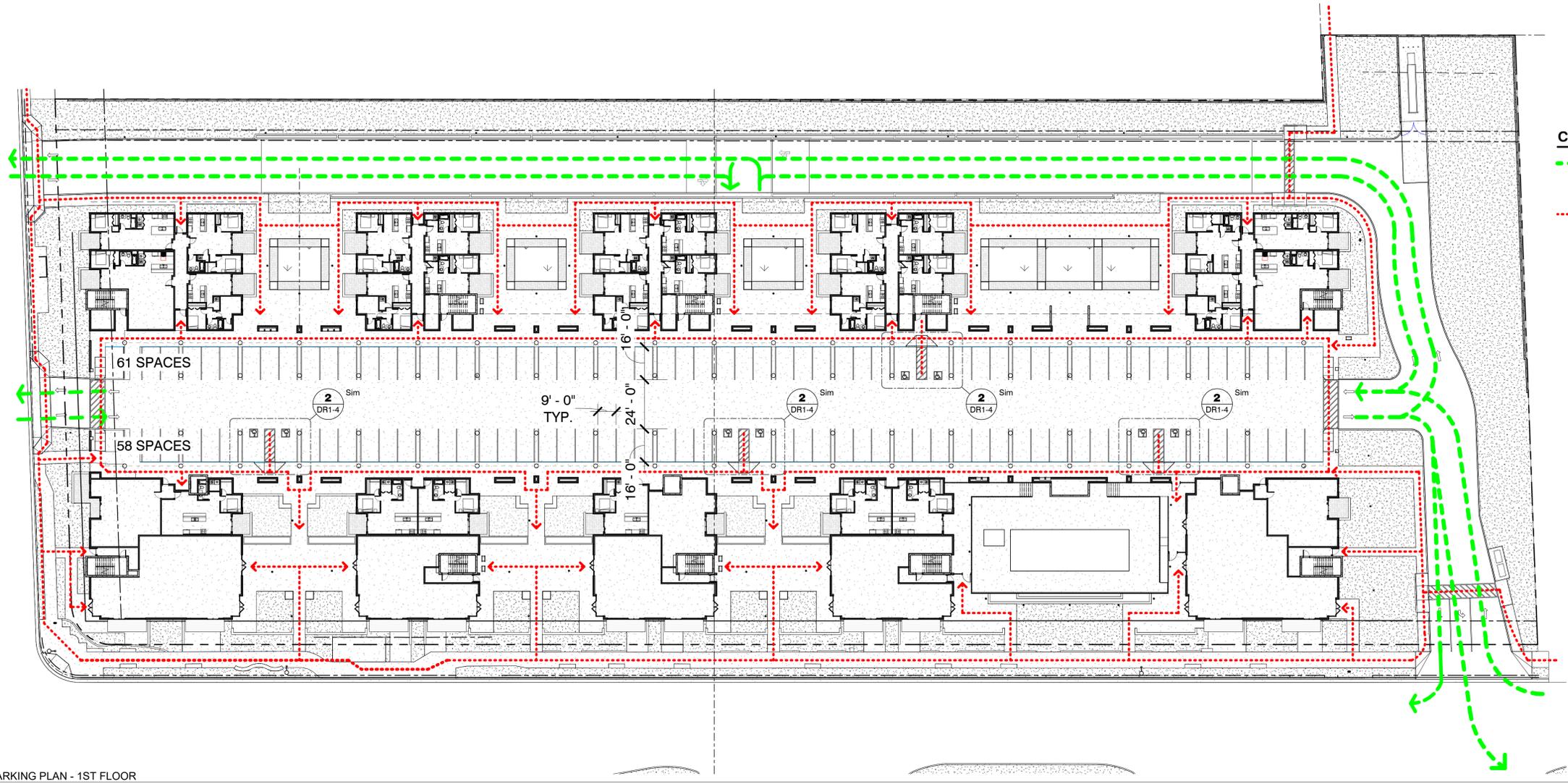
- Field observation of the proposed site and surrounding area was conducted to evaluate the existing physical and operational characteristics of the adjacent roadway network.
- Site traffic volumes generated by the proposed and existing sites were calculated using the *Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition, 2017*.
- Trip generation calculations for the existing and proposed land uses were compared to one another to determine the difference in traffic generated by the site.
- Calculated site traffic was distributed based on existing traffic volumes and assigned to the primary roadways within the project study limits.



Figure 1 – Vicinity Map

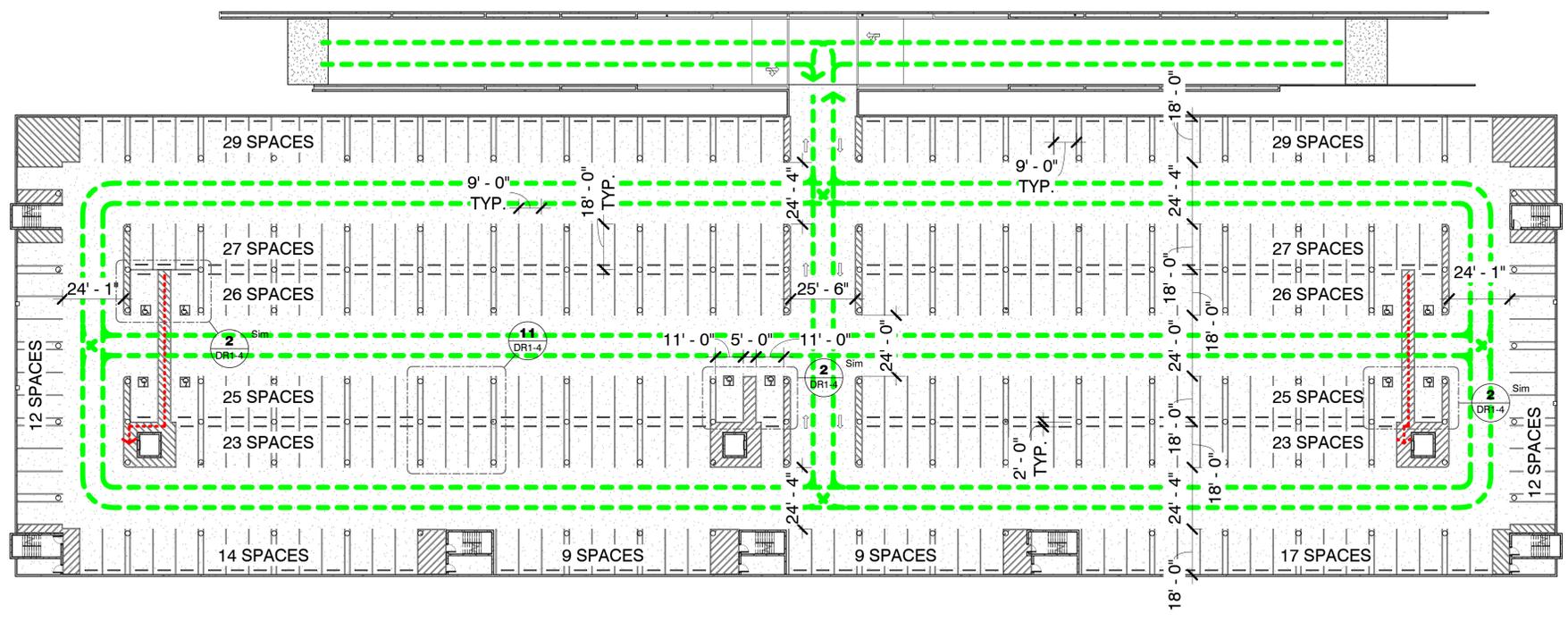


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1 PARKING PLAN - 1ST FLOOR
 1" = 30'-0"

CIRCULATION LEGEND
 --- VEHICULAR CIRCULATION
 --- PEDESTRIAN CIRCULATION



2 PARKING PLAN - BASEMENT
 1" = 30'-0"

DWELLING UNIT REQUIRED PARKING		
UNIT TYPE	# OF UNITS	REQUIRED SPACES
1 BEDROOM UNIT	184	242
2 BEDROOM UNIT	92	156.4
STUDIO UNIT	6	7.5
TOTAL	282	405.9

RETAIL REQUIRED PARKING			
AREA	AREA SF	RATIO	REQUIRED SPACES
RETAIL A	3,745 SF	325 SF	11.52
RETAIL B	2,122 SF	325 SF	6.53
RETAIL C	1,791 SF	325 SF	5.51
RETAIL D	2,190 SF	325 SF	6.74
RETAIL E	2,659 SF	325 SF	8.18
TOTAL			38.48

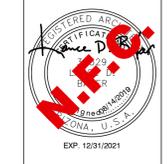
TOTAL REQUIRED PARKING 405.9 + 38.48 = 444.38 = 445 SPACES
 TOTAL REQUIRED BIKE PARKING 425 / 10 = 44.5 = 45 BICYCLES
 PROVIDED DOUBLE BIKE RACKS: 12 DOUBLE RACKS = 48 BICYCLES

PARKING PROVIDED			
BASEMENT			
PARKING SPACE: 9' X 18'		315	
PARKING SPACE: 11' X 18' - ACCESSIBLE		12	
1ST FLOOR			
PARKING SPACE: 9' X 16'		111	2' OVERHANG
PARKING SPACE: 11' X 16' - ACCESSIBLE		8	2' OVERHANG
TOTAL		446	

**NWC N Scottsdale Road & Continental Drive
 Mixed Use Development**

1000 N SCOTTSDALE ROAD
 SCOTTSDALE, AZ

NOT FOR CONSTRUCTION



NOT FOR CONSTRUCTION REVISIONS

Phase: DR
 Drawn By: AF/OM
 Reviewed By: DH
 SDI Project No: 3819
 Date: 08/13/2019
 Sheet:



- Capacity analyses were performed for the existing conditions and future conditions without and with the project based on an opening year of 2019.
- The intersections were analyzed using the methodology presented in the *2016 Highway Capacity Manual 6th Edition (HCM 6th)*.
- The need for auxiliary turn lanes at the study intersections were evaluated based on City of Scottsdale guidelines.
- Crash records were obtained from the City of Scottsdale to identify any specific crash trends within the study area.

Existing Conditions

The existing development at the northwest corner of Continental Drive/Scottsdale Road is a Kia Automobile Dealership. The dealership is served by two existing driveways, one on Continental Drive and one on Scottsdale Road. The access point along the north side of Continental Drive, west of Scottsdale Road, is aligned with the Circle K Driveway on the south side of Continental Drive.

The study area includes the signalized intersection of Continental Drive/Scottsdale Road and the un-signalized intersection of Circle K Driveway/Continental Drive.

Scottsdale Road is a north-south aligned major arterial with a posted speed limit of 40 miles per hour (mph). Three through lanes are offered in each direction, separated by a raised concrete median. Curb, gutter, and sidewalk exist on both sides of the roadway. Bike lanes are provided on both sides of Scottsdale Road, north of Continental Drive.

West of Scottsdale Road, Continental Drive is a three-lane minor collector street. Separated by a two-way, center left turn lane, one lane is provided for eastbound travel and one lane is offered to westbound traffic. To the east, Continental Drive transitions to a two-lane roadway and is known as Roosevelt Street. Curb, gutter, and sidewalk are provided on both sides of the roadway.

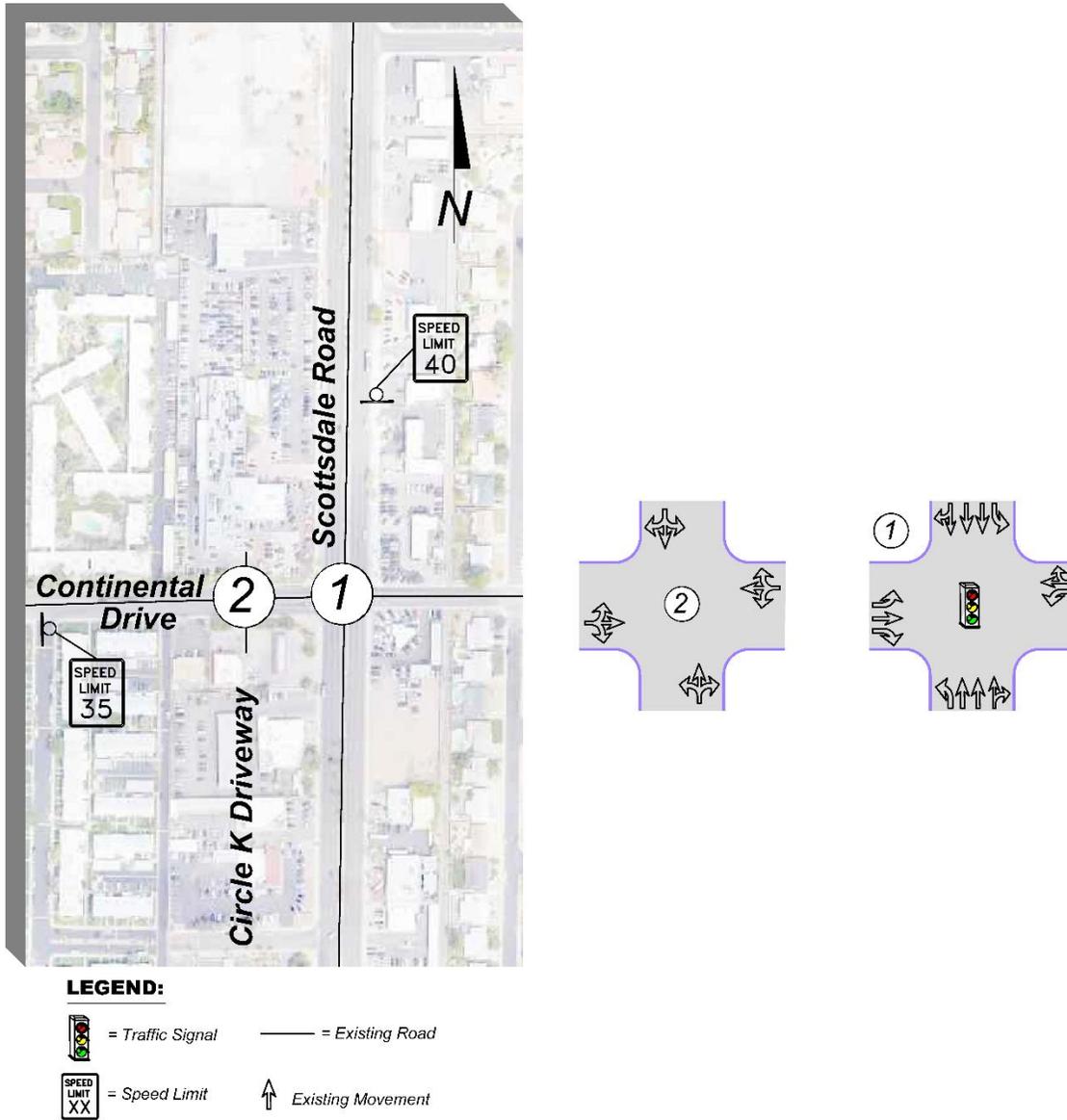
Existing lane configurations and traffic control are shown in **Figure 3**.

Existing Traffic Data

In order to form a basis for analysis of the project impacts, weekday AM and PM peak hour turning movement counts were conducted at the existing intersections of Circle K Driveway/Continental Drive and Continental Drive/Scottsdale Road.

The weekday turning movement counts were conducted from 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM in May 2018.

Figure 3 – Existing Lane Configurations and Traffic Control





Weekday daily total traffic volumes were obtained from historical traffic counts from the City of Scottsdale website. As the most current data provided is from 2016, a review of historical traffic data was conducted to determine an annual traffic growth rate. To more closely reflect the weekday daily volumes in the vicinity for 2018, a 2% annual traffic growth rate was used.

The existing weekday daily total, weekday AM peak hour, and weekday PM peak hour traffic volumes are shown in **Figure 4**. The complete traffic count summaries can be found in the Appendix.

Access

The redevelopment of the site will maintain the access provided to the site by the north leg of the intersection of Circle K Driveway/Continental Drive, located approximately 100 feet west of Scottsdale Road.

A new driveway at the intersection of North Access/Scottsdale Road, located approximately 670 feet north of Continental Drive on Scottsdale Road, will be constructed to provide full access to the project site. Eastbound traffic will be STOP controlled and be provided a dedicated left turn lane and an exclusive right turn lane to exit the site. Northbound vehicles will make use of a left turn lane and three through lanes while the southbound approach to the proposed intersection will offer two through lanes and a shared through/right turn lane.

The proposed West Access will be located approximately 100 feet west of Circle K Driveway, along the north side of Continental Drive. To enter the site, eastbound vehicles will utilize the existing two-way, center left turn lane while westbound travel will be offered a shared through/right turn lane. Southbound vehicles exiting the site will be provided a shared left turn/right turn lane. On the south side of Continental Drive, offset from West Access, Bull Run is a gated driveway that serves a multifamily housing complex to the south. The gate at the intersection of Bull Run/Continental Drive restricts access to and from these residences and is not expected to create conflicts with vehicles entering the Continental Mixed Use site at West Access.

As West Access provides direct access only to the proposed parking areas for residents of the Continental Mixed Use site, it is anticipated that a majority of the traffic along Continental Drive will access the retail portion of the Continental Mixed Use site from the intersection of Circle K Driveway/Continental Drive.

Figure 5 shows the locations, geometry, and spacing for the proposed access points serving the Continental Mixed Use site that will serve as a baseline of the analysis in the report.



Figure 4 – Existing Weekday Peak Hour Traffic Volumes

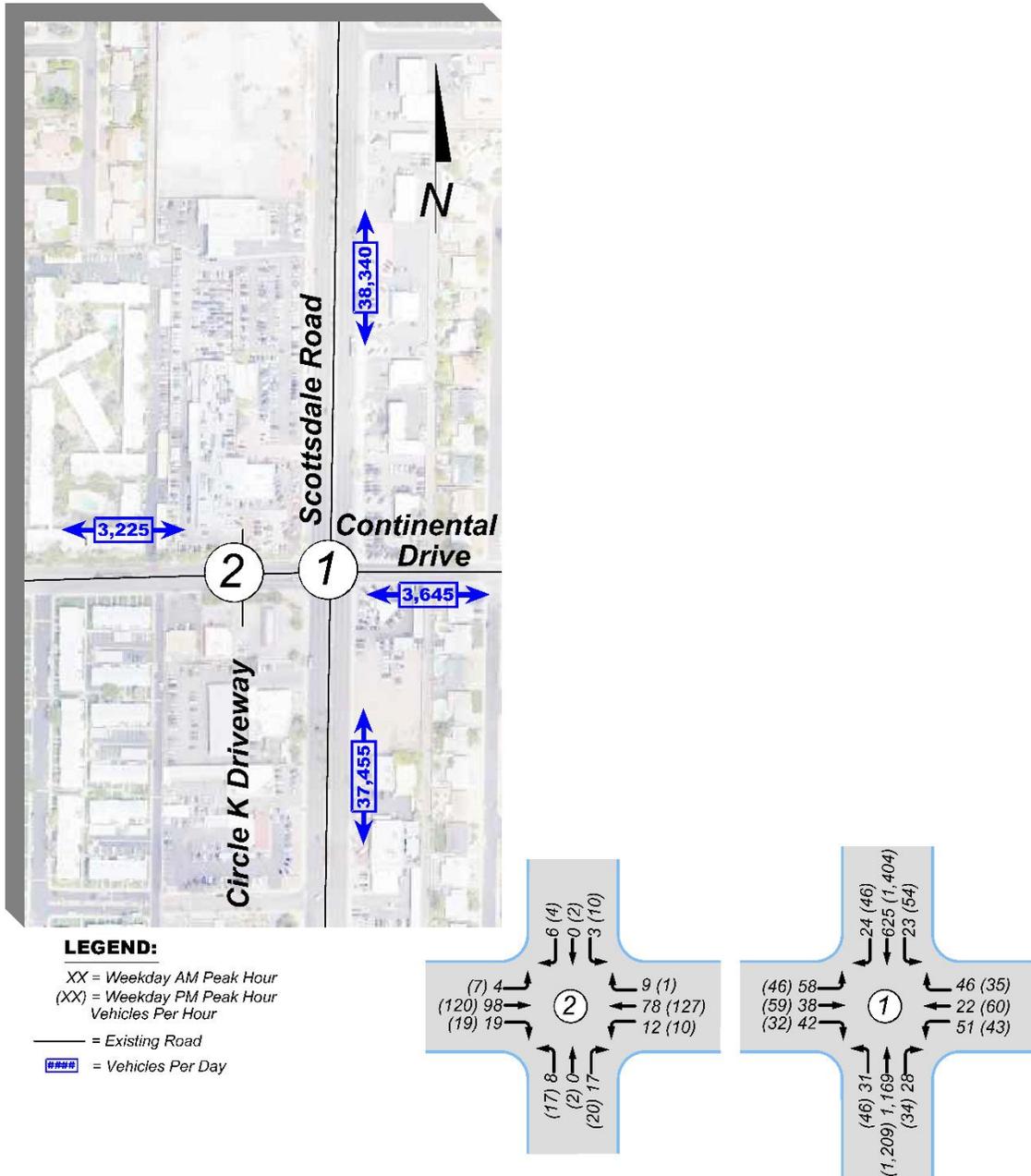
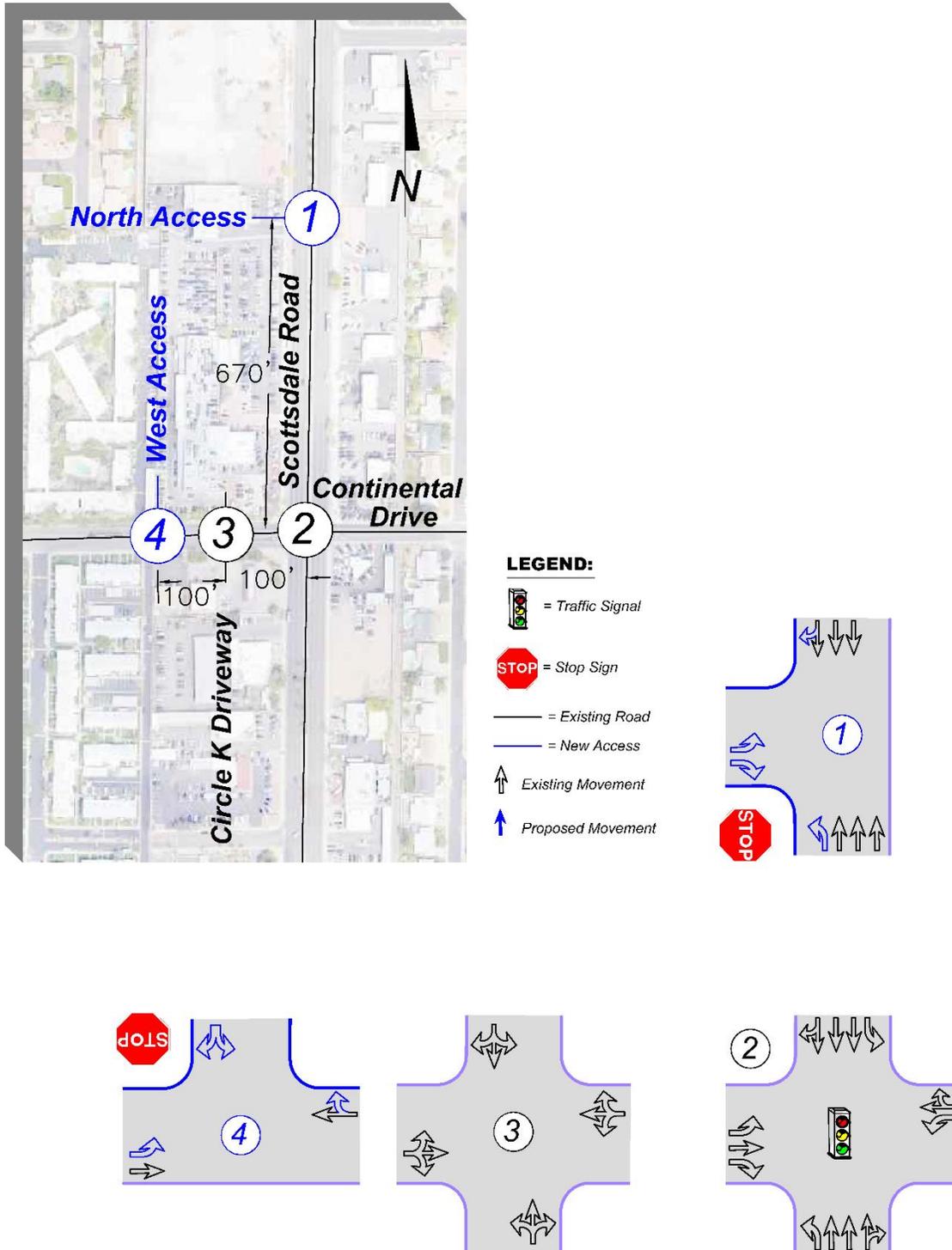




Figure 5 – Study Configuration and Access Spacing





Trip Generation

Trip generation for the project was developed utilizing nationally agreed upon data contained in the Institute of Transportation Engineers (ITE) publication *Trip Generation, 10th Edition, 2017*.

The trip generation was estimated for the construction of 282 apartment units and 12,507 square feet of variety retail space utilizing ITE Land Use Codes (LUC) 221, Multi-Family Housing, Mid-Rise and 814, Variety Store, respectively.

Table 1 presents the results of the ITE trip generation based on the expected uses for the proposed Continental Mixed Use project. The complete trip generation calculations can be found in the Appendix of the report.

Table 1 – Weekday Project Site Generated Trips Using ITE Trip Generation

Time Period	282 Apartment Units, Mid-Rise (LUC 221)	12,507 sqft of Variety Retail (LUC 814)	Total
Average Daily, Inbound (vtpd)	767	397	1,164
Average Daily, Outbound (vtpd)	767	397	1,164
Total Daily	1,534	794	2,328
AM Peak Hour, Inbound (vtph)	27	23	50
AM Peak Hour, Outbound (vtph)	75	17	92
Total AM Peak	102	40	142
PM Peak Hour, Inbound (vtph)	76	45	121
PM Peak Hour, Outbound (vtph)	49	41	90
Total PM Peak	125	86	211

vtpd - vehicle trips per day, vtph - vehicle trips per hour

As part of the Continental Mixed Use project, the existing Kia Automobile Dealership at the northwest corner of Continental Drive/Scottsdale Road will be demolished and replaced by the proposed apartment units and retail space. Trip generation for the dealership was calculated based on the existing 20,900 square feet of building space that includes the indoor showroom, office space, and vehicle service area. **Table 2** shows the difference in trip generation between the existing dealership and the proposed Continental Mixed Use development.



Table 2 – Existing vs. Proposed Trip Generation Comparison

Time Period	Existing Automobile Sales (LUC 840)*	Proposed Development	Difference
Average Daily, Inbound (vtpd)	291	1,164	873
Average Daily, Outbound (vtpd)	291	1,164	873
Total Daily	582	2,328	1,746
AM Peak Hour, Inbound (vtph)	29	50	21
AM Peak Hour, Outbound (vtph)	11	92	81
Total AM Peak	40	142	102
PM Peak Hour, Inbound (vtph)	20	121	101
PM Peak Hour, Outbound (vtph)	31	90	59
Total PM Peak	51	211	160

vtpd - vehicle trips per day, vtph - vehicle trips per hour

As shown in **Table 2**, the redevelopment of the project site is anticipated to generate approximately 102 more vehicle trips per hour (vtph) and 160 more vtph in the weekday AM and PM peak hours, respectively.

Trip Distribution & Assignment

Trip distribution for the proposed project was based on existing traffic patterns observed at the intersection of Continental Drive/Scottsdale Road. **Figure 6** shows the weekday peak hour trip distribution for the project as a percentage of net new primary trips.

Figure 7 shows the assignment of generated vehicle trips to the project intersections within the study area at the completion of the project for the opening year of 2019.

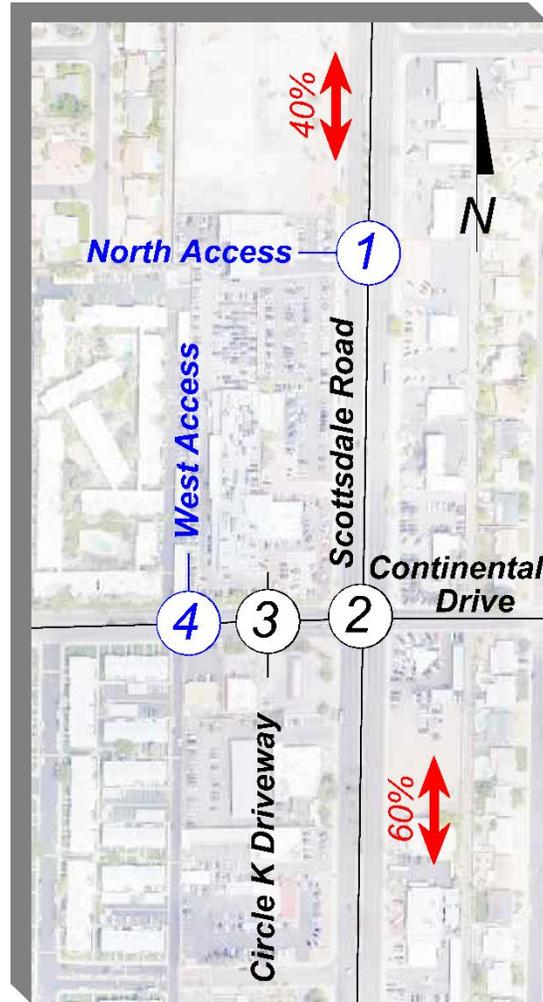
Existing Traffic Operations

Analysis of current intersection operations was conducted for the weekday AM and PM peak hours using the nationally accepted methodology set forth in the *Highway Capacity Manual 6th Edition* Transportation Research Board, 2016 (HCM 6th). The computer software Synchro 10 was utilized to calculate the levels of service for individual movements, approaches, and for the intersections as a whole.

Level of service (LOS) is a qualitative measure of the traffic operations at an intersection or on a roadway segment. Level of service is ranked from LOS A, which signifies little or no congestion and is the highest rank, to LOS F, which signifies congestion and jam conditions. LOS D is typically considered adequate operation at signalized and un-signalized intersections in developed areas.



Figure 6 – Weekday Peak Hour Trip Distribution



LEGEND:

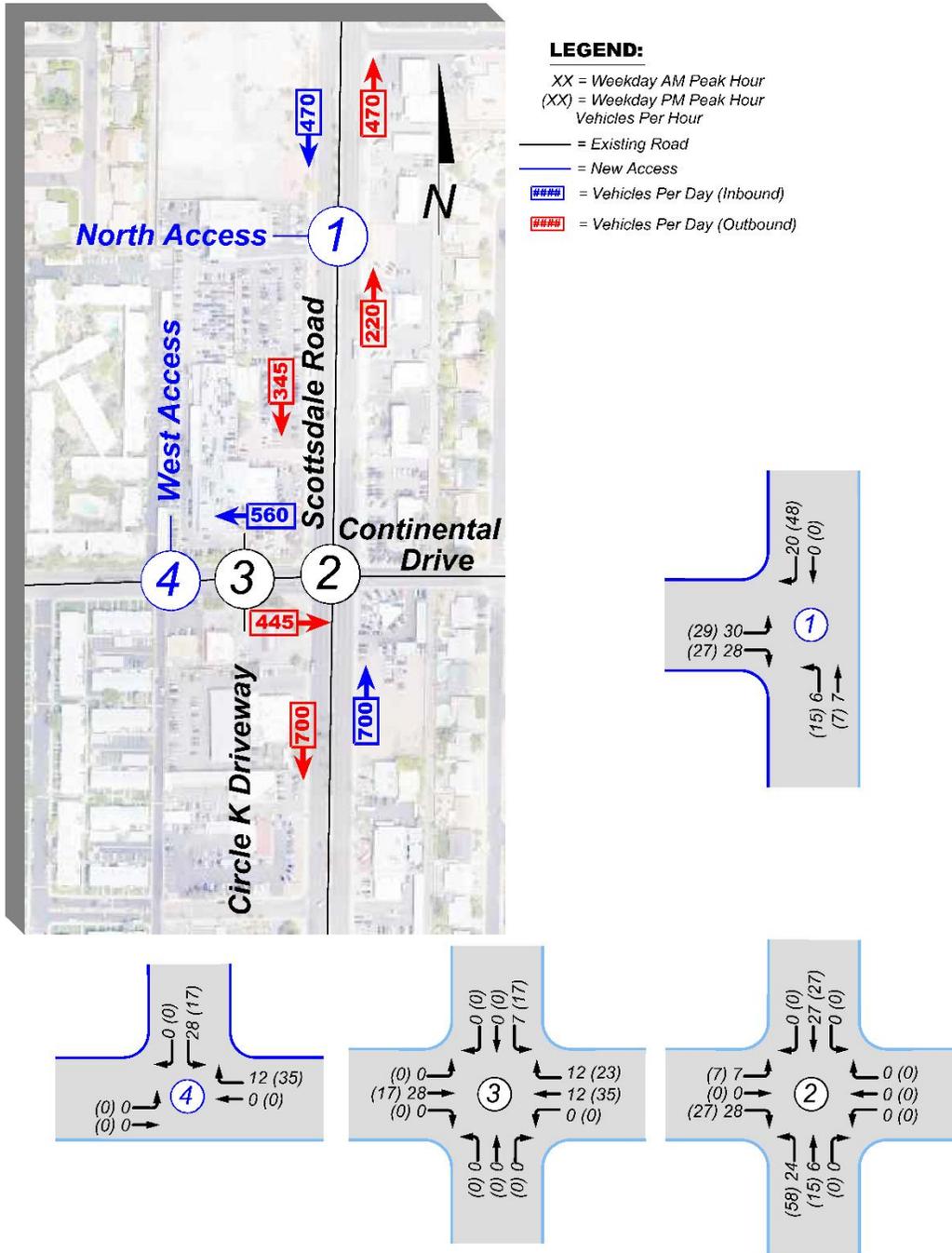
— = Existing Road

— = New Access

XX%
↕ Distribution of Vehicle Trips



Figure 7 – Weekday Peak Hour Trip Assignment





At signalized intersections, level of service is calculated for each movement and then is summed in a weighted fashion to yield the LOS for the approach and for the intersections a whole. The criteria for level of service at signalized intersections are shown in **Table 3**.

In calculating the levels of service, assumed signal phasing and timing data was used. The following assumptions were also made:

- Cycle length – 90 seconds
- Lane widths – 12 feet
- Approach grade – 0%
- Right turn on red allowed

Table 3 - Level of Service Criteria – Signalized Intersections

Level-of-Service	Average Total Delay
A	≤ 10.0 seconds
B	> 10.0 and ≤ 20.0 seconds/vehicle
C	> 20.0 and ≤ 35.0 seconds/vehicle
D	> 35.0 and ≤ 55.0 seconds/vehicle
E	> 55.0 and ≤ 80.0 seconds/vehicle
F	> 80.0 seconds per vehicle

At un-signalized intersections, level of service is predicted/calculated for those movements which must either stop for or yield to oncoming traffic and is based on average control delay for the particular movement. Control delay is the portion of total delay attributed to traffic control measures such as stop signs and traffic signals. The criteria for level of service at un-signalized intersections are shown in **Table 4**.

Table 4 – Level of Service Criteria – Un-signalized Intersections

Level-of-Service	Delay
A	≤ 10 seconds
B	> 10 and ≤ 15 seconds/vehicle
C	> 15 and ≤ 25 seconds/vehicle
D	> 25 and ≤ 35 seconds/vehicle
E	> 35 and ≤ 50 seconds/vehicle
F	> 50 seconds per vehicle

Existing levels of service were calculated for the study intersections. The results of this analysis are shown in **Table 5**. Complete capacity calculations are included in the Appendix.



Table 5 – Existing Weekday Peak Hour Levels of Service

Intersection	AM Peak		PM Peak	
	LOS	Delay	LOS	Delay
Signalized Intersections				
Continental Drive/Scottsdale Road				
Overall Intersection	A	8.7	A	9.9
Eastbound Left	B	17.2	C	21.4
Eastbound Through	B	15.3	B	19.0
Eastbound Right	B	15.6	B	18.6
Westbound Left	B	16.2	C	20.2
Westbound Through/Right	B	16.1	C	20.1
Northbound Left	B	4.9	A	5.8
Northbound Through	A	8.0	A	8.4
Northbound Through/Right	A	9.0	A	9.2
Southbound Left	A	5.5	A	5.4
Southbound Through	A	6.7	A	9.0
Southbound Through/Right	A	7.0	B	10.1
Un-Signalized Intersections				
Circle K Driveway/Continental Drive				
Eastbound Left/Through/Right	A	7.4	A	7.5
Westbound Left/Through/Right	A	7.5	A	7.5
Northbound Left/Through/Right	A	9.4	B	10.2
Southbound Left/Through/Right	A	9.3	B	10.7

Delay - seconds per vehicle

As shown in **Table 5**, all of the study intersections currently operate at an adequate LOS during the weekday AM and PM peak hours.

Future Traffic Operations Without Project

In order to assess the impacts of the project on future traffic operations, traffic projections were made for the opening year of 2019.

A review of historical traffic data in the vicinity of the project showed increasing and decreasing traffic volumes. Due to this, a 2% annual traffic growth rate was used. Weekday traffic volumes in 2019 without the project were estimated with a 2% annual growth rate in **Figure 8**.

As with the current volumes, levels of service were calculated for each of the intersections in the study area for the study year 2019 without the project. Intersection levels of service for 2019 without the project are shown in **Table 6**. Complete capacity calculations are included in the Appendix.



Figure 8 – 2019 Weekday Peak Hour Traffic Volumes Without Project

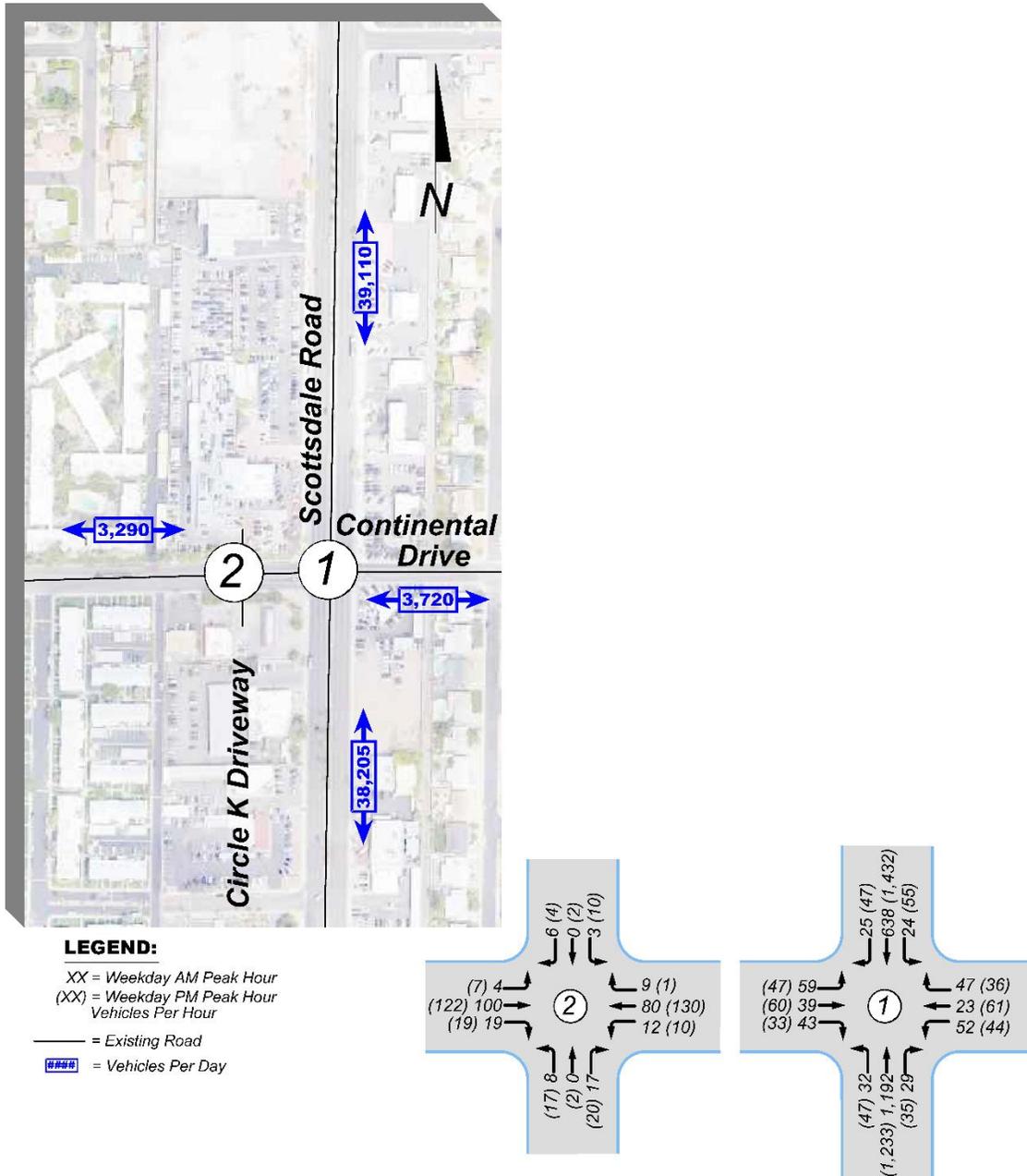




Table 6 – 2019 Weekday Peak Hour Levels of Service Without Project

Intersection	AM Peak		PM Peak	
	LOS	Delay	LOS	Delay
Signalized Intersections				
Continental Drive/Scottsdale Road				
Overall Intersection	A	8.9	B	10.1
Eastbound Left	B	17.2	C	21.4
Eastbound Through	B	15.3	B	19.0
Eastbound Right	B	15.5	B	18.6
Westbound Left	B	16.3	C	20.2
Westbound Through/Right	B	16.1	C	20.1
Northbound Left	A	4.9	A	6.0
Northbound Through	A	8.2	A	8.6
Northbound Through/Right	A	9.2	A	9.4
Southbound Left	A	5.6	A	5.5
Southbound Through	A	6.8	A	9.2
Southbound Through/Right	A	7.2	B	10.3
Un-Signalized Intersections				
Circle K Driveway/Continental Drive				
Eastbound Left/Through/Right	A	7.4	A	7.5
Westbound Left/Through/Right	A	7.5	A	7.5
Northbound Left/Through/Right	A	9.4	B	10.2
Southbound Left/Through/Right	A	9.3	B	10.7

Delay - seconds per vehicle

As shown in **Table 6**, the intersections of Continental Drive/Scottsdale Road and Circle K Driveway/Continental Drive continue to operate at adequate levels of service for the weekday AM and PM peak hours.

Future Traffic Operations With Project

In order to assess the impacts of the project on future traffic operations, levels of service were calculated for each project intersection in 2019, with the project. Weekday peak hour traffic volumes for 2019 without the project were combined with the estimated trips generated by the project to yield weekday peak hour traffic volumes with the project. The weekday peak hour traffic volumes with the project for 2019 are shown in **Figure 9**. To reflect the redevelopment of the project site, existing trips into and out of the north leg of the intersection of Circle K Driveway/Continental Drive were removed from the analysis.

Weekday intersection levels of service for 2019, with the project, were then calculated as shown in **Table 7**. Complete capacity calculations are included in the Appendix.



Figure 9 – 2019 Weekday Peak Hour Traffic Volumes With Project

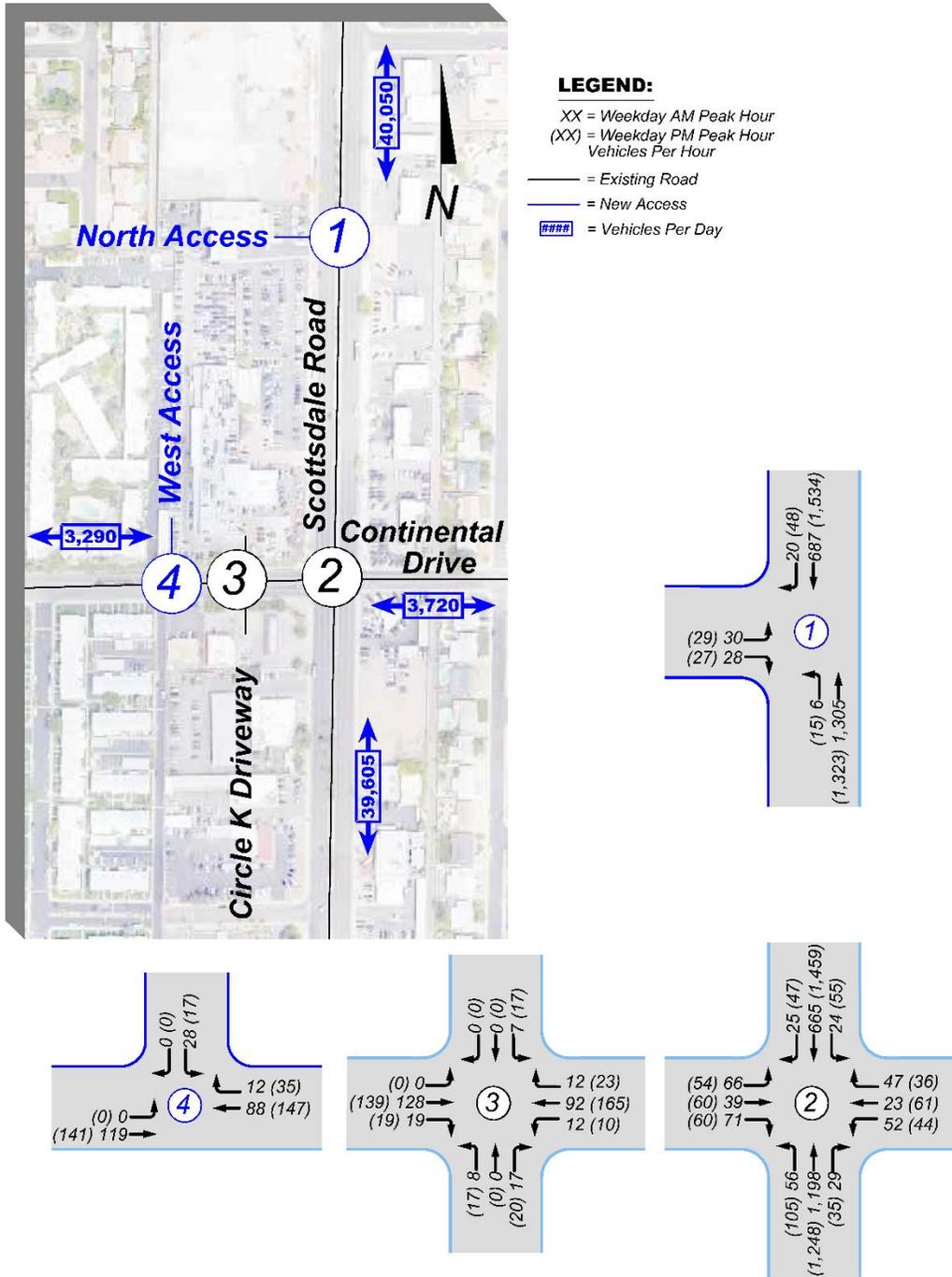




Table 7 – 2019 Weekday Peak Hour Levels of Service With Project

Intersection	2019 Without Project				2019 With Project			
	AM Peak		PM Peak		AM Peak		PM Peak	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Signalized Intersections								
Continental Drive/Scottsdale Road								
Overall Intersection	A	8.9	B	10.1	A	9.4	B	11.2
Eastbound Left	B	17.2	C	21.4	B	17.3	C	21.4
Eastbound Through	B	15.3	B	19.0	B	15.2	B	18.8
Eastbound Right	B	15.5	B	18.6	B	16.1	B	19.1
Westbound Left	B	16.3	C	20.2	B	16.2	C	20.0
Westbound Through/Right	B	16.1	C	20.1	B	15.9	B	19.8
Northbound Left	A	4.9	A	6.0	A	5.2	A	7.3
Northbound Through	A	8.2	A	8.6	A	8.5	A	8.9
Northbound Through/Right	A	9.2	A	9.4	A	9.5	A	9.8
Southbound Left	A	5.6	A	5.5	A	6.0	A	6.0
Southbound Through	A	6.8	A	9.2	A	7.6	B	11.0
Southbound Through/Right	A	7.2	B	10.3	A	8.1	B	12.5
Un-Signalized Intersections								
Circle K Driveway/Continental Drive								
Eastbound Left/Through/Right	A	7.4	A	7.5	A	0.0	A	0.0
Westbound Left/Through/Right	A	7.5	A	7.5	A	7.6	A	7.6
Northbound Left/Through/Right	A	9.4	B	10.2	A	9.6	B	10.4
Southbound Left/Through/Right	A	9.3	B	10.7	B	10.7	B	11.7
North Access/Scottsdale Road								
Eastbound Left					D	25.7	F	>120
Eastbound Right	N/A		N/A		B	12.3	C	20.8
Northbound Left					B	12.2	D	28.0
West Access/Continental Drive								
Southbound Left	N/A		N/A		B	10.0	B	10.6

Delay - seconds per vehicle

As shown in **Table 7**, the proposed intersection of North Access/Scottsdale Road is anticipated to experience delays for the eastbound left turning movement in the weekday PM peak hour in 2019 with traffic from the Continental Mixed Use project. This delay is due to the large northbound and southbound through volumes on Scottsdale Road providing an inadequate number of acceptable gaps for vehicles turning from the minor approach.

Un-signalized minor street intersections along four or more lane, major streets such as Scottsdale Road, tend to have their left turn movements from the minor street operate at LOS E or F during the peak hours.

Turn Lane Analysis

A key element of this traffic analysis is to determine if right or left turn lanes are required at the intersections providing access to the project. The City of Scottsdale *Design Standards & Policies Manual, 2018*, states that “right-turn lanes are required at all street intersections (public or private) on major arterials.”



When needed, turn lanes remove the slowing turning traffic from the through traffic stream, improving capacity and reducing rear-end crashes. **Table 8** shows the locations that were evaluated for right turn lanes based on traffic volumes in 2019 with the project.

Table 8 – Turn Lane Warrants

Intersection	Direction	Turn Treatment Analyzed	Guidelines Applied	Turn Treatments Warranted?
North Access/Scottsdale Road	Southbound	Right Turn Lane	Scottsdale	Yes
Circle K Driveway/Continental Drive	Westbound	Right Turn Lane	Scottsdale	No
West Access/Continental Drive	Westbound	Right Turn Lane	Scottsdale	No

Table 8 shows that a dedicated right turn lane is warranted at North Access along the major arterial of Scottsdale Road.

Queue storage requirements of the warranted turn lane was calculated using the following methods as recommended in *A Policy of Geometric Design of Highways and Streets* (AASHTO, 2011). For un-signalized intersections, storage for vehicles likely to arrive in an average two-minute period within the average weekday peak hour should be provided.

$$\text{Vehicles per 2 min. period} = (\text{vehicles/hour}) \div (30 \text{ periods/hour})$$

$$\text{Storage length} = \text{vehicles per 2 min. period} \times 25 \text{ feet}$$

Table 9 shows the calculated queue length for the southbound right turn lane at the intersection of North Access/Scottsdale Road based on 2019 weekday peak hour traffic volumes without and with traffic from the project. Additionally, the queue length for the eastbound left turning movement along North Access at Scottsdale Road was calculated to ensure adequate storage will be provided on site, as this movement is anticipated to experience delays in 2019 weekday PM peak hour with traffic from the project. The computed values are typically rounded to the nearest 25 feet.

Table 9 – Calculated Queue Lengths

Intersection	Left Turn Storage				Right Turn Storage			
	NB	SB	EB	WB	NB	SB	EB	WB
North Access/Scottsdale Road								
Turning Volume (vph)		29				48		
S _{calculated} =		24				40		
S _{rounded} =		25				50		

S - storage in feet, vph - vehicles per hour



As shown in **Table 9**, the minimum queue lengths required for the southbound right turn movement at the intersection of North Access/Scottsdale Road in 2019 with the project is 50 feet. To meet the minimum right turn storage length for the City of Scottsdale, the southbound right turn lane along Scottsdale Road at North Access should provide at least 100 feet of storage.

A minimum throat distance of 25 feet should be provided for the eastbound approach to the intersection of North Access/Scottsdale Road to accommodate left turning vehicles.

Crash Analysis

Crash history for the Continental Drive/Scottsdale Road study intersection was obtained from the City of Scottsdale. Crash records from May 2013 to May 2018 were analyzed. Within this time period there were forty-nine (49) reported crashes that occurred at the intersection. Results of the crash analysis are shown in **Table 10**.

Angle and rear-end collisions make up the majority of the incidents at the signalized intersection of Continental Drive/Scottsdale Road. In the five year study period, ten (10) angle collisions and fifteen (15) rear-end collisions were reported.

Table 10 – Crash Analysis at Continental Drive/Scottsdale Road

Year	Crash Type							Fatal	Injury	Crash Totals
	Angle	Left Turn	Rear-End	Sideswipe	Single Vehicle	Head On	Other			
2013	3	1	5	0	3	2	0	0	1	14
2014	1	2	2	1	0	0	0	0	1	6
2015	1	2	1	0	1	1	0	0	1	6
2016	1	1	3	0	2	1	3	0	3	11
2017	4	0	4	0	2	0	1	0	0	11
2018	0	0	0	0	1	0	0	0	0	1
5-Year Total	10	6	15	1	9	4	4	0	6	49

A review of the crash data shows that nearly 30% of all crashes at the intersection were rear-end type. This can be attributed to large traffic volumes along Scottsdale Road combined with the presence of a traffic signal. Delays at the intersection of Continental Drive/Scottsdale Road may cause drivers to rush through the intersection, triggering rear-end crashes.

The next most common crash types, angle and single vehicle, are largely due to driver inattention or failure to yield the right-of-way. Approximately 40% of the angle crashes at the intersection of Continental Drive/Scottsdale Road were drivers striking bicyclists or pedestrians within the roadway. Though this can be attributed to driver inattention, it is likely that the presence of bike lanes along Scottsdale Road, north of Continental Drive, and the absence of bike lanes to the south has a negative effect on driver expectations regarding pedestrians and bikes in the roadway.



Approximately 150 feet north of the intersection of Continental Drive/Scottsdale Road, BIKE LANE ENDS signing is provided for southbound roadway users. As users approach the intersection, the solid white pavement marking for the bike lane transitions to “skip dash” white pavement marking to identify the end of the bike lane. This “skip dash” area is often seen by motorists as a “right turn pocket” and may be causing southbound right turning vehicles to encroach into the bike lane area.

It should be noted that this crash summary only includes crashes where a police officer was contacted and wrote a report, otherwise, there is no record of the incident. It is possible that there were other minor crashes along this road, however, as mentioned above, the Police Department was not contacted and no official record of these crashes exists. An expanded summary of the crash data can be found in the Appendix.

Mitigation

The intersection of North Access/Scottsdale Road is anticipated to experience delays for the eastbound left turning movement in 2019 weekday PM peak hour with traffic from the Continental Mixed Use project. The relatively large through volumes along Scottsdale Road in the weekday PM peak hour do not provide a sufficient number of adequate gaps for vehicles turning from the minor approach (North Access). Minor approaches to major roadways, such as Scottsdale Road, tend to experience excessive delays for turning movements in un-signalized conditions.

Mitigation measures to address the eastbound left turn delay expected along North Access at Scottsdale Road are limited. However, it is anticipated that vehicles within the Continental Mixed Use site that intend to travel northbound along Scottsdale Road will avoid the excessive delays at the intersection of North Access/Scottsdale Road and choose to travel to the intersection of Continental Drive/Scottsdale Road via West Access or Circle K Driveway to complete their eastbound left turn movement at the existing traffic signal.

Conclusion

When fully completed, the proposed Continental Mixed Use project is predicted to generate an additional 2,328 vehicle trips per day (vtpd) on weekdays to the adjacent street system from the new project site. Fifty percent of these new trips (1,164 vehicle trips) will be into the project and fifty percent will be out of the project.

All of the study intersections currently operate at adequate levels of service and are expected to continue doing so in 2019 without the Continental Mixed Use project.



The proposed intersection of North Access/Scottsdale Road is anticipated to experience delays for the eastbound left turning movement in the weekday PM peak hour in 2019 with traffic from the Continental Mixed Use project. This delay is due to the large northbound and southbound through volumes on Scottsdale Road providing an inadequate number of acceptable gaps for vehicles turning from the minor approach.

Un-signalized minor street intersections along four or more lane, major streets such as Scottsdale Road, tend to have their left turn movements from the minor street operate at LOS E or F during the peak hours.

The remaining study intersections are expected to operate at adequate levels of service with the inclusion of the traffic generated by the Continental Mixed Use site in 2019 with the project.

A southbound right turn lane is warranted at the intersection of North Access/Scottsdale Road and requires a minimum of 50 feet of storage.

A minimum throat distance of 25 feet should be provided for the eastbound approach to the intersection of North Access/Scottsdale Road to accommodate left turning vehicles.

A review of the crash data shows that nearly 30% of all crashes at the intersection were rear-end type. This can be attributed to large traffic volumes along Scottsdale Road combined with the presence of a traffic signal. Delays at the intersection of Continental Drive/Scottsdale Road may cause drivers to rush through the intersection, triggering rear-end crashes.

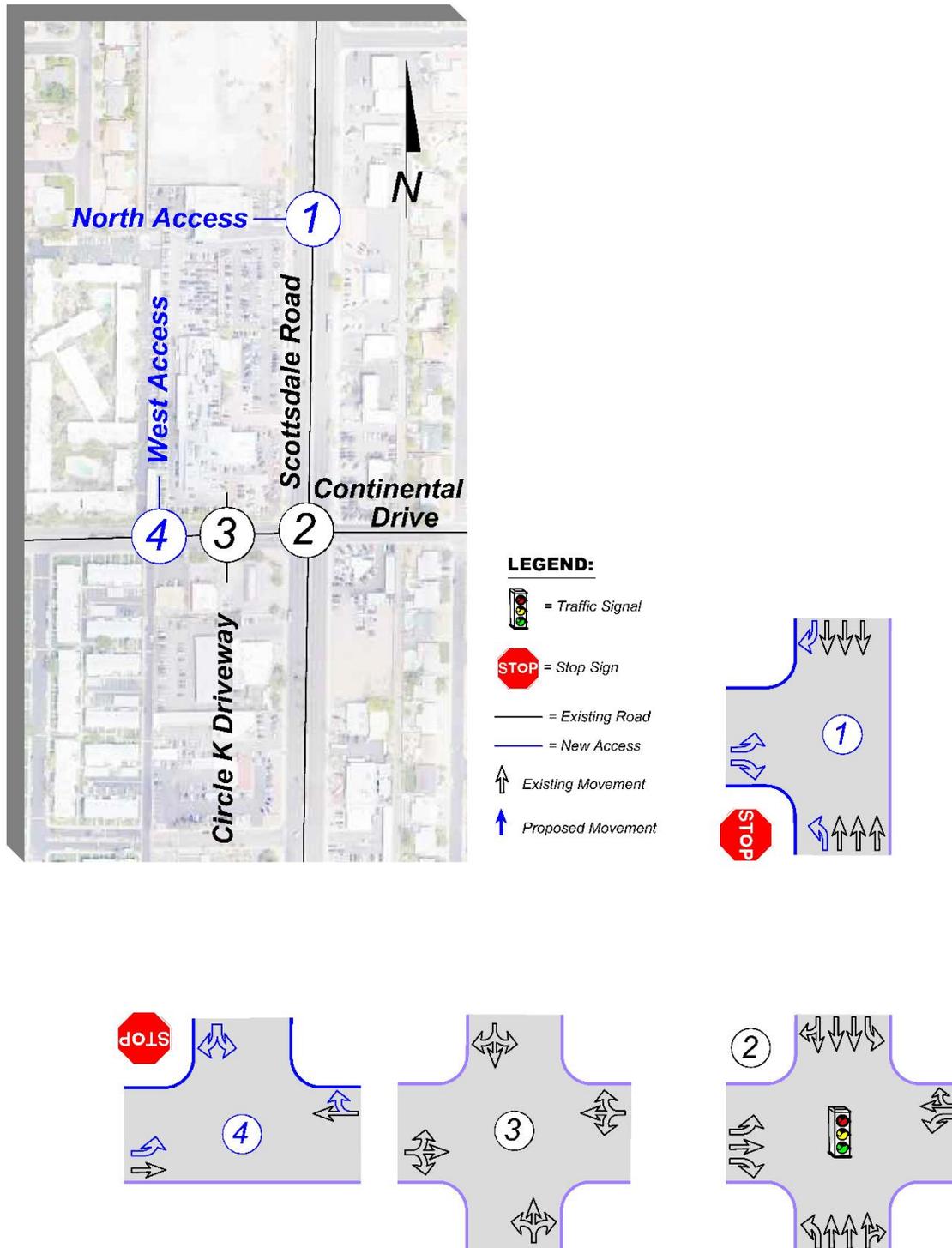
Mitigation measures to address the eastbound left turn delay expected along North Access at Scottsdale Road are limited. However, it is anticipated that vehicles within the Continental Mixed Use site that intend to travel northbound along Scottsdale Road will avoid the excessive delays at the intersection of North Access/Scottsdale Road and choose to travel to the intersection of Continental Drive/Scottsdale Road via West Access or Circle K Driveway to complete their eastbound left turn movement at the existing traffic signal.

It is recommended that the southbound right turn lane along Scottsdale Road at North Access be constructed with 100 feet of storage to meet the minimum right turn storage length for the City of Scottsdale.

The intersection of North Access/Scottsdale Road should be constructed to provide a minimum of 25 feet of storage for eastbound left turning vehicles.

Proposed lane configurations and traffic control are shown in **Figure 10**.

Figure 10 – Proposed Lane Configurations





**TRAFFIC IMPACT ANALYSIS
CONTINENTAL MIXED USE
CONTINENTAL DRIVE/SCOTTSDALE ROAD**

APPENDIX

Traffic Counts

Trip Generation Calculations

Capacity Calculations

Turn Lane Calculations

Crash Data

Comment Resolution



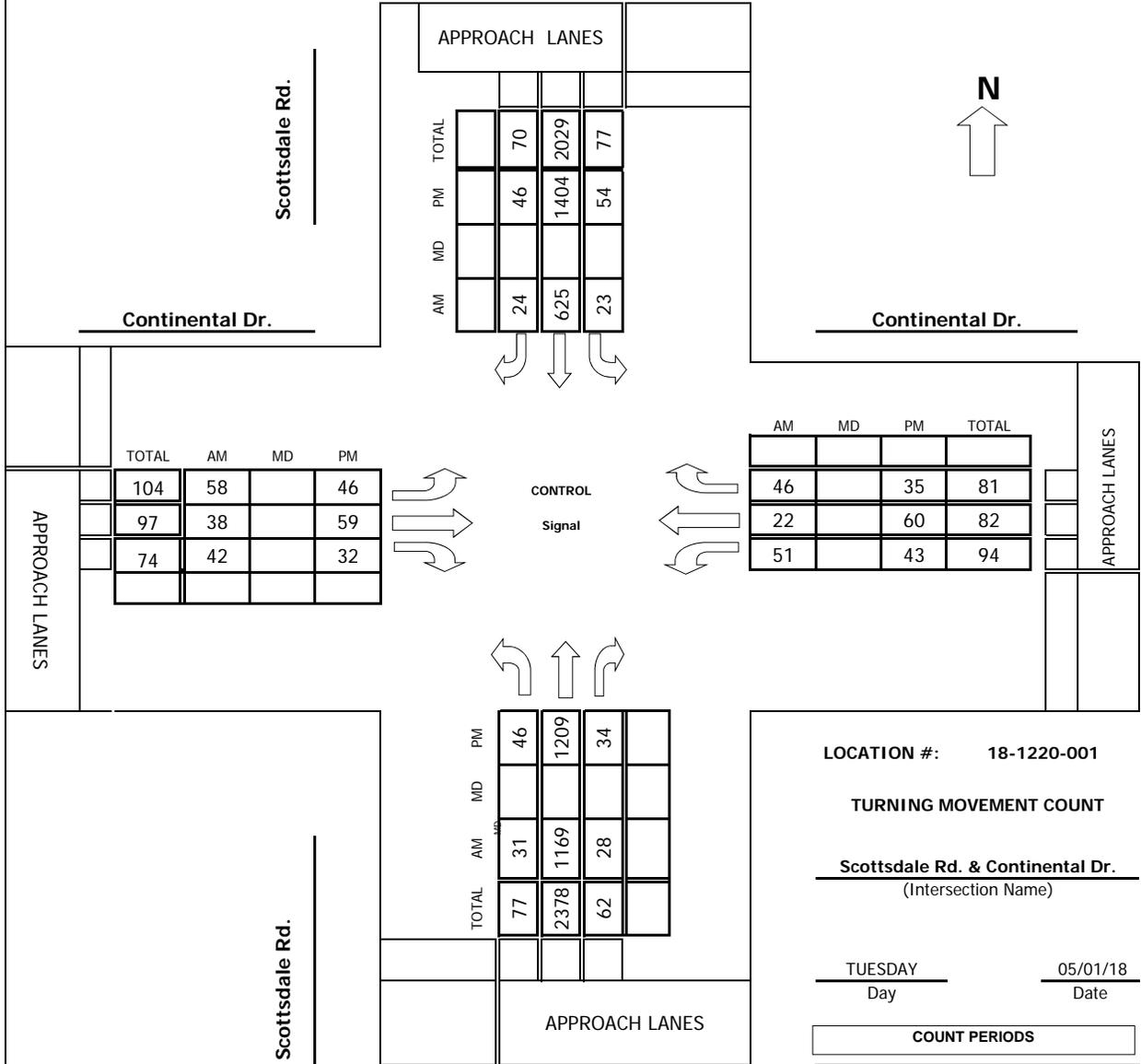
**TRAFFIC IMPACT ANALYSIS
CONTINENTAL MIXED USE
CONTINENTAL DRIVE/SCOTTSDALE ROAD**

APPENDIX

Traffic Counts

Project #: 18-1220-001

TMC SUMMARY OF Scottsdale Rd. & Continental Dr.



LOCATION #: 18-1220-001

TURNING MOVEMENT COUNT

Scottsdale Rd. & Continental Dr.
 (Intersection Name)

TUESDAY 05/01/18
 Day Date

COUNT PERIODS		
AM	700AM	900AM
NOON	-	-
PM	400PM	600PM

AM PEAK HOUR 730 AM
 NOON PEAK HOUR _____
 PM PEAK HOUR 445 PM

Intersection Turning Movement

Prepared by:



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



N-S STREET: **Scottsdale Rd.** DATE: **05/01/18** LOCATION: **Scottsdale**
 E-W STREET: **Continental Dr.** DAY: **TUESDAY** PROJECT# **18-1220-001**

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	1	3	0	1	3	0	1	1	1	1	1	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	8	218	10	7	115	9	11	3	7	5	6	10	409
7:15 AM	5	253	6	3	121	3	9	10	13	15	5	12	455
7:30 AM	11	355	9	6	161	4	16	13	15	17	6	10	623
7:45 AM	5	281	7	7	167	7	9	12	8	10	5	11	529
8:00 AM	4	274	5	4	159	8	14	9	12	12	6	10	517
8:15 AM	11	259	7	6	138	5	19	4	7	12	5	15	488
8:30 AM	8	282	4	1	168	9	21	6	3	6	11	9	528
8:45 AM	7	208	5	5	159	8	11	7	6	6	17	11	450
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	59	2130	53	39	1188	53	110	64	71	83	61	88	3999
Approach %	2.63	95.00	2.36	3.05	92.81	4.14	44.90	26.12	28.98	35.78	26.29	37.93	
App/Depart	2242	/	2328	1280	/	1342	245	/	156	232	/	173	

AM Peak Hr Begins at: 730 AM

PEAK

Volumes	31	1169	28	23	625	24	58	38	42	51	22	46	2157
Approach %	2.52	95.20	2.28	3.42	93.01	3.57	42.03	27.54	30.43	42.86	18.49	38.66	

PEAK HR.

FACTOR:	0.819	0.928	0.784	0.902	0.866
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CONTROL: **Signal**
 COMMENT 1:
 GPS: **33.458493, -111.926371**

Intersection Turning Movement



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



N-S STREET: **Scottsdale Rd.** DATE: **05/01/18** LOCATION: **Scottsdale**
 E-W STREET: **Continental Dr.** DAY: **TUESDAY** PROJECT#: **18-1220-001**

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	1	3	0	1	3	0	1	1	1	1	1	0	

1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	6	265	11	16	301	17	11	18	5	9	9	16	684
4:15 PM	17	243	9	15	329	16	9	14	4	1	7	6	670
4:30 PM	7	296	6	13	353	5	16	19	5	6	10	5	741
4:45 PM	4	309	10	9	339	16	10	13	8	7	18	9	752
5:00 PM	15	300	8	11	363	8	16	15	6	12	18	12	784
5:15 PM	16	299	7	27	354	11	11	17	14	10	11	6	783
5:30 PM	11	301	9	7	348	11	9	14	4	14	13	8	749
5:45 PM	17	283	7	15	342	10	7	13	6	14	9	7	730
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	93	2296	67	113	2729	94	89	123	52	73	95	69	5893
Approach %	3.79	93.49	2.73	3.85	92.95	3.20	33.71	46.59	19.70	30.80	40.08	29.11	
App/Depart	2456	/	2454	2936	/	2854	264	/	303	237	/	282	

PM Peak Hr Begins at: 445 PM

PEAK

Volumes	46	1209	34	54	1404	46	46	59	32	43	60	35	3068
Approach %	3.57	93.79	2.64	3.59	93.35	3.06	33.58	43.07	23.36	31.16	43.48	25.36	

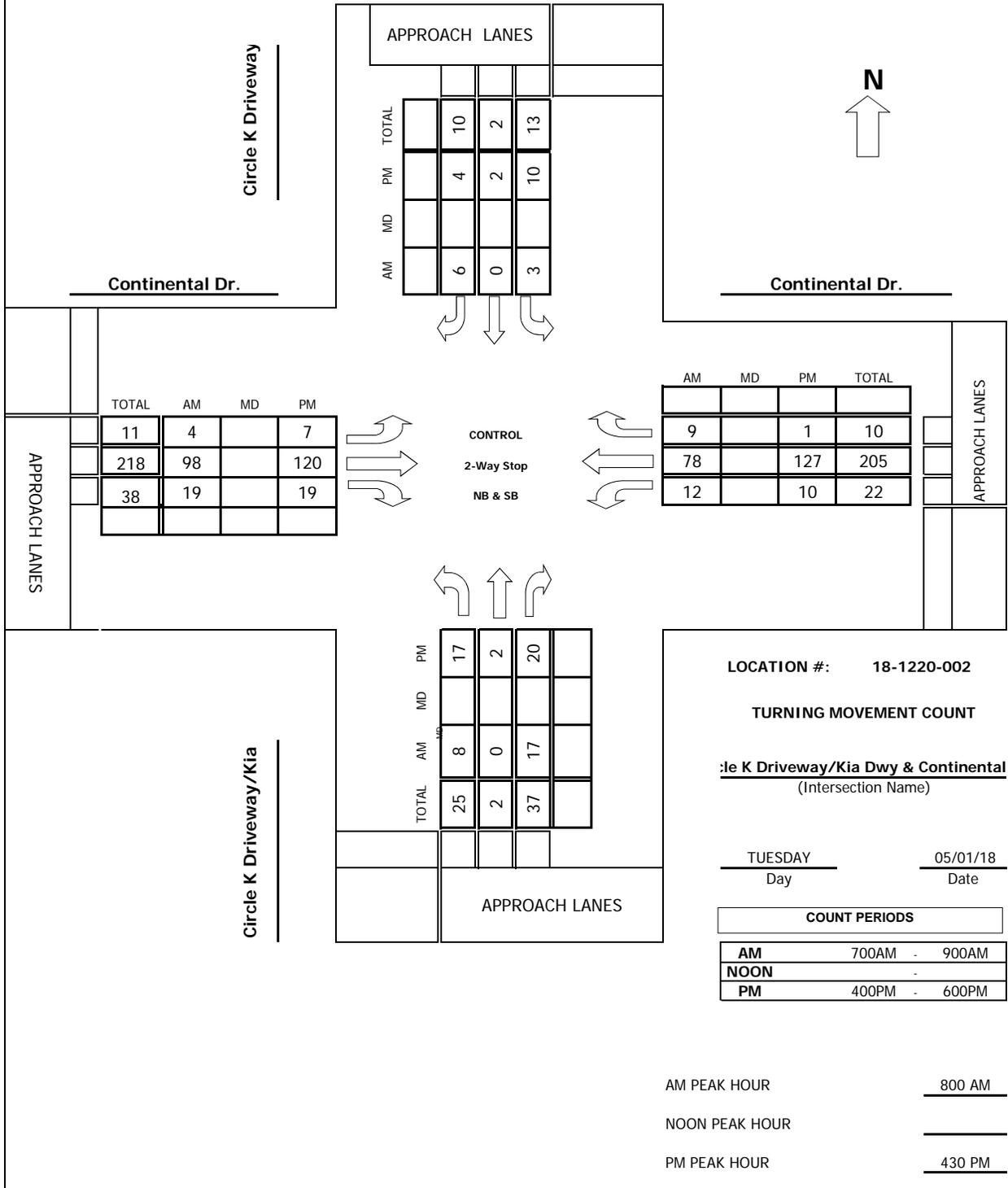
PEAK HR.

FACTOR:	0.998	0.959	0.815	0.821	0.978
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CONTROL: **Signal**
 COMMENT 1: **0**
 GPS: **33.458493, -111.926371**

Project #: 18-1220-002

TMC SUMMARY OF Circle K Driveway/Kia Dwy & Continental Dr.



Intersection Turning Movement

Prepared by:



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



N-S STREET: Circle K Driveway/Kia Dwy DATE: 05/01/18 LOCATION: Tempe
 E-W STREET: Continental Dr. DAY: TUESDAY PROJECT#: 18-1220-002

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
LANES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	0	1	0	0	1	0	0	1	0	0	1	0	

6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	2	0	3	0	0	0	1	19	4	4	18	0	51
7:15 AM	2	0	6	0	0	0	0	26	11	2	11	0	58
7:30 AM	4	0	8	0	0	0	2	37	3	2	16	3	75
7:45 AM	4	0	2	0	0	0	2	26	2	1	13	2	52
8:00 AM	2	0	7	1	0	2	0	27	6	3	14	1	63
8:15 AM	3	0	1	0	0	1	1	28	7	5	14	2	62
8:30 AM	2	0	6	1	0	0	3	24	5	2	24	2	69
8:45 AM	1	0	3	1	0	3	0	19	1	2	26	4	60
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	20	0	36	3	0	6	9	206	39	21	136	14	490
Approach %	35.71	0.00	64.29	33.33	0.00	66.67	3.54	81.10	15.35	12.28	79.53	8.19	
App/Depart	56	/	23	9	/	60	254	/	245	171	/	162	

AM Peak Hr Begins at: 800 AM

PEAK

Volumes	8	0	17	3	0	6	4	98	19	12	78	9	254
Approach %	32.00	0.00	68.00	33.33	0.00	66.67	3.31	80.99	15.70	12.12	78.79	9.09	

PEAK HR.

FACTOR:	0.694	0.563	0.840	0.773	0.920
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CONTROL: 2-Way Stop (NB & SB)
 COMMENT 1:
 GPS: 33.458475, -111.927049

Intersection Turning Movement



FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745



N-S STREET: Circle K Driveway/Kia Dwy DATE: 05/01/18 LOCATION: Tempe
0
 E-W STREET: Continental Dr. DAY: TUESDAY PROJECT#: 18-1220-002

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	0	1	0	0	1	0	0	1	0	0	1	0	

1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	3	0	5	0	0	0	0	30	8	1	31	0	78
4:15 PM	7	1	2	0	1	1	0	25	9	2	36	3	87
4:30 PM	3	2	5	1	1	1	2	35	4	1	19	1	75
4:45 PM	5	0	7	2	1	1	2	21	5	0	38	0	82
5:00 PM	2	0	6	4	0	1	0	27	5	5	35	0	85
5:15 PM	7	0	2	3	0	1	3	37	5	4	35	0	97
5:30 PM	7	0	6	1	1	1	0	19	4	3	29	3	74
5:45 PM	6	1	2	0	2	1	0	24	4	1	35	1	77
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	40	4	35	11	6	7	7	218	44	17	258	8	655
Approach %	50.63	5.06	44.30	45.83	25.00	29.17	2.60	81.04	16.36	6.01	91.17	2.83	
App/Depart	79	/	19	24	/	67	269	/	264	283	/	305	

PM Peak Hr Begins at: 430 PM

PEAK

Volumes	17	2	20	10	2	4	7	120	19	10	127	1	339
Approach %	43.59	5.13	51.28	62.50	12.50	25.00	4.79	82.19	13.01	7.25	92.03	0.72	

PEAK HR.

FACTOR:	0.813	0.800	0.811	0.863	0.874
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CONTROL: 2-Way Stop (NB & SB)
 COMMENT 1: 0
 GPS: 33.458475, -111.927049



**TRAFFIC IMPACT ANALYSIS
CONTINENTAL MIXED USE
CONTINENTAL DRIVE/SCOTTSDALE ROAD**

APPENDIX

Trip Generation Calculations

Variety Store

LAND USE: 12,507 Square Feet Variety Store

TRIP GENERATION CALCULATIONS ARE BASED ON THE INSTITUTE OF TRANSPORTATION ENGINEERS' TRIP GENERATION, 10TH EDITION. THE ITE LAND USE CODE IS Variety Store (814), General Urban/Suburban

Weekday

Average Rate = 63.47 Trips per 1000 Square Feet (sqft)

$T = 63.47 \text{ Trips} \times 12507 \text{ sqft} / 1000$

T = 794 VTPD

ENTER: $(0.5) \times (793.81929) = 397 \text{ VTPD}$

EXIT: $(0.5) \times (793.81929) = 397 \text{ VTPD}$

AM PEAK HOUR (ONE HOUR BETWEEN 7 AND 9 AM)

Average Rate = 3.18 Trips per 1000 Square Feet (sqft)

$T = 3.18 \text{ Trips} \times 12507 \text{ sqft} / 1000$

T = 40 VPH

ENTER: $(0.57) \times (40) = 23 \text{ VPH}$

EXIT: $(0.43) \times (40) = 17 \text{ VPH}$

PM PEAK HOUR (ONE HOUR BETWEEN 4 AND 6 PM)

Average Rate = 6.84 Trips per 1000 Square Feet (sqft)

$T = 6.84 \text{ Trips} \times 12507 \text{ sqft} / 1000$

T = 86 VPH

ENTER: $(0.52) \times (86) = 45 \text{ VPH}$

EXIT: $(0.48) \times (86) = 41 \text{ VPH}$

*where, T = trip ends

TRIP GENERATION SUMMARY

SATURDAY

794 VTPD

AM PEAK HOUR (ONE HOUR BETWEEN 7 AND 9 AM)

40 VPH

PM PEAK HOUR (ONE HOUR BETWEEN 4 AND 6 PM)

86 VPH

Multifamily Housing, Mid-Rise

LAND USE: 282 Dwelling Units Multifamily Housing, Mid-Rise

TRIP GENERATION CALCULATIONS ARE BASED ON THE INSTITUTE OF TRANSPORTATION ENGINEERS' TRIP GENERATION, 10TH EDITION. THE ITE LAND USE CODE IS Multifamily Housing, Mid-Rise (221), General Urban/Suburban

Weekday

Average Rate = 5.44 Trips per Dwelling Unit (d.u.)

T = 5.44 Trips x 282 d.u.

T = 1,534 VTPD

ENTER: $(0.5) \times (1534.08) = 767$ VTPD

EXIT: $(0.5) \times (1534.08) = 767$ VTPD

AM PEAK HOUR (ONE HOUR BETWEEN 7 AND 9 AM)

Average Rate = 0.36 Trips per Dwelling Unit (d.u.)

T = 0.36 Trips x 282 d.u.

T = 102 VPH

ENTER: $(0.26) \times (102) = 27$ VPH

EXIT: $(0.74) \times (102) = 75$ VPH

PM PEAK HOUR (ONE HOUR BETWEEN 4 AND 6 PM)

Average Rate = 0.44 Trips per Dwelling Unit (d.u.)

T = 0.44 Trips x 282 d.u.

T = 125 VPH

ENTER: $(0.61) \times (125) = 76$ VPH

EXIT: $(0.39) \times (125) = 49$ VPH

*where, T = trip ends

TRIP GENERATION SUMMARY

SATURDAY

1,534 VTPD

AM PEAK HOUR (ONE HOUR BETWEEN 7 AND 9 AM)

102 VPH

PM PEAK HOUR (ONE HOUR BETWEEN 4 AND 6 PM)

125 VPH

Automobile Sales (New)

LAND USE: 20,900 Square Feet Automobile Sales (New)

TRIP GENERATION CALCULATIONS ARE BASED ON THE INSTITUTE OF TRANSPORTATION ENGINEERS' TRIP GENERATION, 10TH EDITION. THE ITE LAND USE CODE IS Automobile Sales (New) (840), General Urban/Suburban

Weekday

Average Rate = 27.84 Trips per 1000 Square Feet (sqft)

$T = 27.84 \text{ Trips} \times 20900 \text{ sqft} / 1000$

T = 582 VTPD

ENTER: $(0.5) \times (581.856) = 291 \text{ VTPD}$

EXIT: $(0.5) \times (581.856) = 291 \text{ VTPD}$

AM PEAK HOUR (ONE HOUR BETWEEN 7 AND 9 AM)

Average Rate = 1.87 Trips per 1000 Square Feet (sqft)

$T = 1.87 \text{ Trips} \times 20900 \text{ sqft} / 1000$

T = 40 VPH

ENTER: $(0.73) \times (40) = 29 \text{ VPH}$

EXIT: $(0.27) \times (40) = 11 \text{ VPH}$

PM PEAK HOUR (ONE HOUR BETWEEN 4 AND 6 PM)

Average Rate = 2.43 Trips per 1000 Square Feet (sqft)

$T = 2.43 \text{ Trips} \times 20900 \text{ sqft} / 1000$

T = 51 VPH

ENTER: $(0.4) \times (51) = 20 \text{ VPH}$

EXIT: $(0.6) \times (51) = 31 \text{ VPH}$

*where, T = trip ends

TRIP GENERATION SUMMARY

SATURDAY

582 VTPD

AM PEAK HOUR (ONE HOUR BETWEEN 7 AND 9 AM)

40 VPH

PM PEAK HOUR (ONE HOUR BETWEEN 4 AND 6 PM)

51 VPH



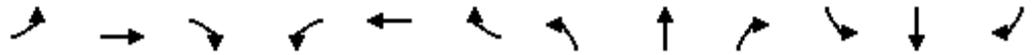
**TRAFFIC IMPACT ANALYSIS
CONTINENTAL MIXED USE
CONTINENTAL DRIVE/SCOTTSDALE ROAD**

APPENDIX

Capacity Calculations

HCM 6th Signalized Intersection Summary
 3: Scottsdale Road & Continental Drive/Roosevelt Street

05/15/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	58	38	42	51	22	46	31	1169	28	23	625	24
Future Volume (veh/h)	58	38	42	51	22	46	31	1169	28	23	625	24
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	63	41	46	55	24	50	34	1271	30	25	679	26
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	316	266	226	342	77	160	547	2509	59	370	2422	92
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.04	0.49	0.49	0.03	0.48	0.48
Sat Flow, veh/h	1326	1870	1585	1310	541	1127	1781	5132	121	1781	5047	193
Grp Volume(v), veh/h	63	41	46	55	0	74	34	843	458	25	457	248
Grp Sat Flow(s),veh/h/ln	1326	1870	1585	1310	0	1668	1781	1702	1849	1781	1702	1836
Q Serve(g_s), s	1.8	0.8	1.0	1.5	0.0	1.6	0.4	6.7	6.7	0.3	3.2	3.2
Cycle Q Clear(g_c), s	3.4	0.8	1.0	2.3	0.0	1.6	0.4	6.7	6.7	0.3	3.2	3.2
Prop In Lane	1.00		1.00	1.00		0.68	1.00		0.07	1.00		0.10
Lane Grp Cap(c), veh/h	316	266	226	342	0	237	547	1664	904	370	1634	881
V/C Ratio(X)	0.20	0.15	0.20	0.16	0.00	0.31	0.06	0.51	0.51	0.07	0.28	0.28
Avail Cap(c_a), veh/h	1773	2321	1967	1781	0	2070	856	1664	904	651	1634	881
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.9	15.0	15.1	16.0	0.0	15.4	4.8	6.9	6.9	5.4	6.2	6.2
Incr Delay (d2), s/veh	0.3	0.3	0.4	0.2	0.0	0.7	0.0	1.1	2.0	0.1	0.4	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.3	0.3	0.4	0.0	0.6	0.1	1.8	2.2	0.1	0.9	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.2	15.3	15.6	16.2	0.0	16.1	4.9	8.0	9.0	5.5	6.7	7.0
LnGrp LOS	B	B	B	B	A	B	A	A	A	A	A	A
Approach Vol, veh/h		150			129			1335			730	
Approach Delay, s/veh		16.2			16.2			8.3			6.7	
Approach LOS		B			B			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.7	24.0		10.2	6.1	23.6		10.2				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	7.5	19.5		49.5	8.5	18.5		49.5				
Max Q Clear Time (g_c+I1), s	2.3	8.7		5.4	2.4	5.2		4.3				
Green Ext Time (p_c), s	0.0	6.2		0.6	0.0	3.8		0.6				
Intersection Summary												
HCM 6th Ctrl Delay			8.7									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary
 3: Scottsdale Road & Continental Drive/Roosevelt Street

05/15/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	59	32	43	60	35	46	1209	34	54	1404	46
Future Volume (veh/h)	46	59	32	43	60	35	46	1209	34	54	1404	46
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	50	64	35	47	65	38	50	1314	37	59	1526	50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	262	265	225	292	157	92	345	2676	75	394	2693	88
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.05	0.52	0.52	0.06	0.53	0.53
Sat Flow, veh/h	1291	1870	1585	1296	1107	647	1781	5105	144	1781	5078	166
Grp Volume(v), veh/h	50	64	35	47	0	103	50	876	475	59	1023	553
Grp Sat Flow(s),veh/h/ln	1291	1870	1585	1296	0	1754	1781	1702	1844	1781	1702	1840
Q Serve(g_s), s	1.8	1.5	0.9	1.6	0.0	2.6	0.6	8.0	8.0	0.7	9.8	9.8
Cycle Q Clear(g_c), s	4.4	1.5	0.9	3.1	0.0	2.6	0.6	8.0	8.0	0.7	9.8	9.8
Prop In Lane	1.00		1.00	1.00		0.37	1.00		0.08	1.00		0.09
Lane Grp Cap(c), veh/h	262	265	225	292	0	248	345	1785	967	394	1805	976
V/C Ratio(X)	0.19	0.24	0.16	0.16	0.00	0.41	0.15	0.49	0.49	0.15	0.57	0.57
Avail Cap(c_a), veh/h	1260	1711	1450	1294	0	1605	749	1785	967	531	1805	976
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.0	18.6	18.3	19.9	0.0	19.0	5.6	7.4	7.4	5.2	7.7	7.7
Incr Delay (d2), s/veh	0.4	0.5	0.3	0.3	0.0	1.1	0.2	1.0	1.8	0.2	1.3	2.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.6	0.3	0.5	0.0	1.0	0.2	2.3	2.7	0.2	2.9	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.4	19.0	18.6	20.2	0.0	20.1	5.8	8.4	9.2	5.4	9.0	10.1
LnGrp LOS	C	B	B	C	A	C	A	A	A	A	A	B
Approach Vol, veh/h		149			150			1401			1635	
Approach Delay, s/veh		19.7			20.2			8.6			9.2	
Approach LOS		B			C			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.2	30.0		11.4	7.0	30.3		11.4				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	6.5	25.5		44.5	13.5	18.5		44.5				
Max Q Clear Time (g_c+I1), s	2.7	10.0		6.4	2.6	11.8		5.1				
Green Ext Time (p_c), s	0.0	8.2		0.6	0.1	4.9		0.8				
Intersection Summary												
HCM 6th Ctrl Delay			9.9									
HCM 6th LOS			A									

HCM 6th TWSC
8: Circle K Driveway & Continental Drive

05/15/2018

Intersection												
Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	98	19	12	78	9	8	0	17	3	0	6
Future Vol, veh/h	4	98	19	12	78	9	8	0	17	3	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	107	21	13	85	10	9	0	18	3	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	95	0	0	128	0	0	246	247	118	251	252	90
Stage 1	-	-	-	-	-	-	126	126	-	116	116	-
Stage 2	-	-	-	-	-	-	120	121	-	135	136	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1499	-	-	1458	-	-	708	655	934	702	651	968
Stage 1	-	-	-	-	-	-	878	792	-	889	800	-
Stage 2	-	-	-	-	-	-	884	796	-	868	784	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1499	-	-	1458	-	-	697	647	934	682	643	968
Mov Cap-2 Maneuver	-	-	-	-	-	-	697	647	-	682	643	-
Stage 1	-	-	-	-	-	-	875	790	-	886	793	-
Stage 2	-	-	-	-	-	-	870	789	-	848	782	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0.9			9.4			9.3		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	842	1499	-	-	1458	-	-	849
HCM Lane V/C Ratio	0.032	0.003	-	-	0.009	-	-	0.012
HCM Control Delay (s)	9.4	7.4	0	-	7.5	0	-	9.3
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

HCM 6th TWSC
8: Circle K Driveway & Continental Drive

05/15/2018

Intersection												
Int Delay, s/veh	2.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	7	120	19	10	127	1	17	2	20	10	2	4
Future Vol, veh/h	7	120	19	10	127	1	17	2	20	10	2	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	130	21	11	138	1	18	2	22	11	2	4

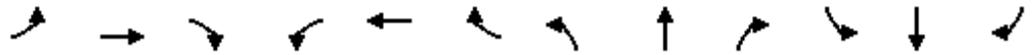
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	139	0	0	151	0	0	321	318	141	330	328	139
Stage 1	-	-	-	-	-	-	157	157	-	161	161	-
Stage 2	-	-	-	-	-	-	164	161	-	169	167	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1445	-	-	1430	-	-	632	598	907	623	591	909
Stage 1	-	-	-	-	-	-	845	768	-	841	765	-
Stage 2	-	-	-	-	-	-	838	765	-	833	760	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1445	-	-	1430	-	-	621	590	907	600	583	909
Mov Cap-2 Maneuver	-	-	-	-	-	-	621	590	-	600	583	-
Stage 1	-	-	-	-	-	-	840	763	-	836	759	-
Stage 2	-	-	-	-	-	-	825	759	-	806	755	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.4			0.5			10.2			10.7		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	738	1445	-	-	1430	-	-	653
HCM Lane V/C Ratio	0.057	0.005	-	-	0.008	-	-	0.027
HCM Control Delay (s)	10.2	7.5	0	-	7.5	0	-	10.7
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

HCM 6th Signalized Intersection Summary
 3: Scottsdale Road & Continental Drive/Roosevelt Street

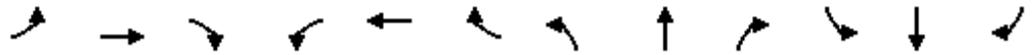
05/15/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	59	39	43	52	23	47	32	1192	29	24	638	25
Future Volume (veh/h)	59	39	43	52	23	47	32	1192	29	24	638	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	64	42	47	57	25	51	35	1296	32	26	693	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	317	270	229	343	79	162	540	2496	62	365	2411	94
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.04	0.49	0.49	0.03	0.48	0.48
Sat Flow, veh/h	1323	1870	1585	1308	549	1120	1781	5125	127	1781	5043	196
Grp Volume(v), veh/h	64	42	47	57	0	76	35	861	467	26	467	253
Grp Sat Flow(s),veh/h/ln	1323	1870	1585	1308	0	1669	1781	1702	1848	1781	1702	1835
Q Serve(g_s), s	1.8	0.8	1.0	1.6	0.0	1.6	0.4	7.0	7.0	0.3	3.3	3.3
Cycle Q Clear(g_c), s	3.5	0.8	1.0	2.4	0.0	1.6	0.4	7.0	7.0	0.3	3.3	3.3
Prop In Lane	1.00		1.00	1.00		0.67	1.00		0.07	1.00		0.11
Lane Grp Cap(c), veh/h	317	270	229	343	0	241	540	1658	900	365	1627	877
V/C Ratio(X)	0.20	0.16	0.21	0.17	0.00	0.31	0.06	0.52	0.52	0.07	0.29	0.29
Avail Cap(c_a), veh/h	1762	2312	1959	1771	0	2063	847	1658	900	643	1627	877
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.9	15.0	15.1	16.0	0.0	15.4	4.9	7.1	7.1	5.5	6.3	6.3
Incr Delay (d2), s/veh	0.3	0.3	0.4	0.2	0.0	0.7	0.0	1.2	2.1	0.1	0.4	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.3	0.3	0.4	0.0	0.6	0.1	1.9	2.3	0.1	0.9	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.2	15.3	15.5	16.3	0.0	16.1	4.9	8.2	9.2	5.6	6.8	7.2
LnGrp LOS	B	B	B	B	A	B	A	A	A	A	A	A
Approach Vol, veh/h		153			133			1363			746	
Approach Delay, s/veh		16.2			16.2			8.5			6.9	
Approach LOS		B			B			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.8	24.0		10.3	6.1	23.6		10.3				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	7.5	19.5		49.5	8.5	18.5		49.5				
Max Q Clear Time (g_c+I1), s	2.3	9.0		5.5	2.4	5.3		4.4				
Green Ext Time (p_c), s	0.0	6.2		0.6	0.0	3.9		0.6				
Intersection Summary												
HCM 6th Ctrl Delay			8.9									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary
 3: Scottsdale Road & Continental Drive/Roosevelt Street

05/15/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	47	60	33	44	61	36	47	1233	35	55	1432	47
Future Volume (veh/h)	47	60	33	44	61	36	47	1233	35	55	1432	47
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	51	65	36	48	66	39	51	1340	38	60	1557	51
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	263	269	228	294	158	94	340	2667	76	388	2684	88
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.05	0.52	0.52	0.06	0.53	0.53
Sat Flow, veh/h	1289	1870	1585	1294	1102	651	1781	5104	145	1781	5078	166
Grp Volume(v), veh/h	51	65	36	48	0	105	51	894	484	60	1044	564
Grp Sat Flow(s),veh/h/ln	1289	1870	1585	1294	0	1753	1781	1702	1844	1781	1702	1840
Q Serve(g_s), s	1.8	1.5	1.0	1.7	0.0	2.7	0.6	8.3	8.3	0.7	10.2	10.2
Cycle Q Clear(g_c), s	4.5	1.5	1.0	3.2	0.0	2.7	0.6	8.3	8.3	0.7	10.2	10.2
Prop In Lane	1.00		1.00	1.00		0.37	1.00		0.08	1.00		0.09
Lane Grp Cap(c), veh/h	263	269	228	294	0	252	340	1779	964	388	1799	973
V/C Ratio(X)	0.19	0.24	0.16	0.16	0.00	0.42	0.15	0.50	0.50	0.15	0.58	0.58
Avail Cap(c_a), veh/h	1253	1706	1445	1287	0	1599	741	1779	964	524	1799	973
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.1	18.5	18.3	19.9	0.0	19.0	5.8	7.5	7.5	5.3	7.8	7.8
Incr Delay (d2), s/veh	0.4	0.5	0.3	0.3	0.0	1.1	0.2	1.0	1.9	0.2	1.4	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.6	0.3	0.5	0.0	1.1	0.2	2.4	2.8	0.2	3.0	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.4	19.0	18.6	20.2	0.0	20.1	6.0	8.6	9.4	5.5	9.2	10.3
LnGrp LOS	C	B	B	C	A	C	A	A	A	A	A	B
Approach Vol, veh/h		152			153			1429			1668	
Approach Delay, s/veh		19.7			20.1			8.8			9.5	
Approach LOS		B			C			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.3	30.0		11.5	7.0	30.3		11.5				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	6.5	25.5		44.5	13.5	18.5		44.5				
Max Q Clear Time (g_c+I1), s	2.7	10.3		6.5	2.6	12.2		5.2				
Green Ext Time (p_c), s	0.0	8.3		0.6	0.1	4.8		0.8				
Intersection Summary												
HCM 6th Ctrl Delay				10.1								
HCM 6th LOS				B								

HCM 6th TWSC
8: Circle K Driveway & Continental Drive

05/15/2018

Intersection												
Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	100	19	12	80	9	8	0	17	3	0	6
Future Vol, veh/h	4	100	19	12	80	9	8	0	17	3	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	109	21	13	87	10	9	0	18	3	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	97	0	0	130	0	0	250	251	120	255	256	92
Stage 1	-	-	-	-	-	-	128	128	-	118	118	-
Stage 2	-	-	-	-	-	-	122	123	-	137	138	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1496	-	-	1455	-	-	703	652	931	698	648	965
Stage 1	-	-	-	-	-	-	876	790	-	887	798	-
Stage 2	-	-	-	-	-	-	882	794	-	866	782	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1496	-	-	1455	-	-	692	644	931	678	640	965
Mov Cap-2 Maneuver	-	-	-	-	-	-	692	644	-	678	640	-
Stage 1	-	-	-	-	-	-	873	788	-	884	791	-
Stage 2	-	-	-	-	-	-	868	787	-	846	780	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0.9			9.4			9.3		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	838	1496	-	-	1455	-	-	846
HCM Lane V/C Ratio	0.032	0.003	-	-	0.009	-	-	0.012
HCM Control Delay (s)	9.4	7.4	0	-	7.5	0	-	9.3
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

HCM 6th TWSC
8: Circle K Driveway & Continental Drive

05/15/2018

Intersection												
Int Delay, s/veh	2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	7	122	19	10	130	1	17	2	20	10	2	4
Future Vol, veh/h	7	122	19	10	130	1	17	2	20	10	2	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	133	21	11	141	1	18	2	22	11	2	4

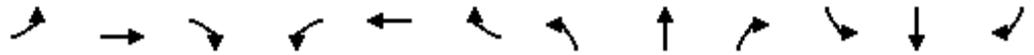
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	142	0	0	154	0	0	327	324	144	336	334	142
Stage 1	-	-	-	-	-	-	160	160	-	164	164	-
Stage 2	-	-	-	-	-	-	167	164	-	172	170	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1441	-	-	1426	-	-	626	594	903	618	586	906
Stage 1	-	-	-	-	-	-	842	766	-	838	762	-
Stage 2	-	-	-	-	-	-	835	762	-	830	758	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1441	-	-	1426	-	-	615	586	903	595	578	906
Mov Cap-2 Maneuver	-	-	-	-	-	-	615	586	-	595	578	-
Stage 1	-	-	-	-	-	-	837	761	-	833	756	-
Stage 2	-	-	-	-	-	-	822	756	-	803	753	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.4			0.5			10.2			10.7		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	733	1441	-	-	1426	-	-	648
HCM Lane V/C Ratio	0.058	0.005	-	-	0.008	-	-	0.027
HCM Control Delay (s)	10.2	7.5	0	-	7.5	0	-	10.7
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

HCM 6th Signalized Intersection Summary
 3: Scottsdale Road & Continental Drive/Roosevelt Street

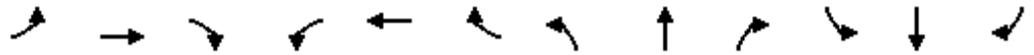
08/15/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	39	71	52	23	47	56	1198	29	24	665	25
Future Volume (veh/h)	66	39	71	52	23	47	56	1198	29	24	665	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	72	42	77	57	25	51	61	1302	32	26	723	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	327	288	244	348	85	172	544	2479	61	359	2293	85
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.06	0.48	0.48	0.03	0.45	0.45
Sat Flow, veh/h	1323	1870	1585	1273	549	1120	1781	5126	126	1781	5052	188
Grp Volume(v), veh/h	72	42	77	57	0	76	61	865	469	26	486	264
Grp Sat Flow(s),veh/h/ln	1323	1870	1585	1273	0	1669	1781	1702	1848	1781	1702	1836
Q Serve(g_s), s	2.1	0.8	1.8	1.7	0.0	1.6	0.7	7.2	7.2	0.3	3.7	3.7
Cycle Q Clear(g_c), s	3.7	0.8	1.8	2.4	0.0	1.6	0.7	7.2	7.2	0.3	3.7	3.7
Prop In Lane	1.00		1.00	1.00		0.67	1.00		0.07	1.00		0.10
Lane Grp Cap(c), veh/h	327	288	244	348	0	257	544	1646	894	359	1545	833
V/C Ratio(X)	0.22	0.15	0.32	0.16	0.00	0.30	0.11	0.53	0.53	0.07	0.31	0.32
Avail Cap(c_a), veh/h	1730	2271	1924	1697	0	2026	806	1646	894	631	1545	833
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.9	14.9	15.3	16.0	0.0	15.3	5.2	7.3	7.3	5.9	7.1	7.1
Incr Delay (d2), s/veh	0.3	0.2	0.7	0.2	0.0	0.6	0.1	1.2	2.2	0.1	0.5	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.3	0.6	0.4	0.0	0.6	0.2	2.0	2.4	0.1	1.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.3	15.2	16.1	16.2	0.0	15.9	5.2	8.5	9.5	6.0	7.6	8.1
LnGrp LOS	B	B	B	B	A	B	A	A	A	A	A	A
Approach Vol, veh/h		191			133			1395			776	
Approach Delay, s/veh		16.3			16.0			8.7			7.7	
Approach LOS		B			B			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.8	24.2		10.8	7.0	23.0		10.8				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	7.5	19.5		49.5	8.5	18.5		49.5				
Max Q Clear Time (g_c+I1), s	2.3	9.2		5.7	2.7	5.7		4.4				
Green Ext Time (p_c), s	0.0	6.2		0.7	0.0	4.0		0.7				
Intersection Summary												
HCM 6th Ctrl Delay			9.4									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary
 3: Scottsdale Road & Continental Drive/Roosevelt Street

08/15/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	60	60	44	61	36	105	1248	35	55	1459	47
Future Volume (veh/h)	54	60	60	44	61	36	105	1248	35	55	1459	47
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	59	65	65	48	66	39	114	1357	38	60	1586	51
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	272	284	241	299	167	99	370	2641	74	380	2510	81
Arrive On Green	0.15	0.15	0.15	0.15	0.15	0.15	0.08	0.52	0.52	0.06	0.49	0.49
Sat Flow, veh/h	1289	1870	1585	1260	1102	651	1781	5106	143	1781	5082	163
Grp Volume(v), veh/h	59	65	65	48	0	105	114	905	490	60	1062	575
Grp Sat Flow(s),veh/h/ln	1289	1870	1585	1260	0	1753	1781	1702	1845	1781	1702	1841
Q Serve(g_s), s	2.1	1.5	1.8	1.7	0.0	2.7	1.4	8.6	8.6	0.8	11.3	11.3
Cycle Q Clear(g_c), s	4.8	1.5	1.8	3.2	0.0	2.7	1.4	8.6	8.6	0.8	11.3	11.3
Prop In Lane	1.00		1.00	1.00		0.37	1.00		0.08	1.00		0.09
Lane Grp Cap(c), veh/h	272	284	241	299	0	266	370	1761	954	380	1682	909
V/C Ratio(X)	0.22	0.23	0.27	0.16	0.00	0.39	0.31	0.51	0.51	0.16	0.63	0.63
Avail Cap(c_a), veh/h	1240	1689	1431	1245	0	1583	715	1761	954	514	1682	909
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.0	18.4	18.5	19.8	0.0	18.9	6.8	7.8	7.8	5.8	9.2	9.2
Incr Delay (d2), s/veh	0.4	0.4	0.6	0.2	0.0	0.9	0.5	1.1	2.0	0.2	1.8	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.6	0.6	0.5	0.0	1.0	0.4	2.5	3.0	0.2	3.6	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.4	18.8	19.1	20.0	0.0	19.8	7.3	8.9	9.8	6.0	11.0	12.5
LnGrp LOS	C	B	B	C	A	B	A	A	A	A	B	B
Approach Vol, veh/h		189			153			1509			1697	
Approach Delay, s/veh		19.7			19.9			9.1			11.3	
Approach LOS		B			B			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.3	30.0		12.0	8.5	28.9		12.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	6.5	25.5		44.5	13.5	18.5		44.5				
Max Q Clear Time (g_c+I1), s	2.8	10.6		6.8	3.4	13.3		5.2				
Green Ext Time (p_c), s	0.0	8.3		0.8	0.2	4.1		0.8				
Intersection Summary												
HCM 6th Ctrl Delay				11.2								
HCM 6th LOS				B								

HCM 6th TWSC
6: Scottsdale Road & North Access

08/15/2019

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↵	↶	↵	↑↑↑	↑↑↑	
Traffic Vol, veh/h	30	27	6	1305	687	20
Future Vol, veh/h	30	27	6	1305	687	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	33	29	7	1418	747	22

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1339	385	769	0	-	0
Stage 1	758	-	-	-	-	-
Stage 2	581	-	-	-	-	-
Critical Hdwy	5.74	7.14	5.34	-	-	-
Critical Hdwy Stg 1	6.64	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.82	3.92	3.12	-	-	-
Pot Cap-1 Maneuver	209	524	505	-	-	-
Stage 1	339	-	-	-	-	-
Stage 2	476	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	206	524	505	-	-	-
Mov Cap-2 Maneuver	206	-	-	-	-	-
Stage 1	334	-	-	-	-	-
Stage 2	476	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19.4	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	505	-	206	524	-	-
HCM Lane V/C Ratio	0.013	-	0.158	0.056	-	-
HCM Control Delay (s)	12.2	-	25.7	12.3	-	-
HCM Lane LOS	B	-	D	B	-	-
HCM 95th %tile Q(veh)	0	-	0.6	0.2	-	-

HCM 6th TWSC
6: Scottsdale Road & North Access

08/15/2019

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↵	↶	↵	↑↑↑	↑↑↑	
Traffic Vol, veh/h	29	27	15	1326	1534	48
Future Vol, veh/h	29	27	15	1326	1534	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	29	16	1441	1667	52

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2301	860	1719	0	-	0
Stage 1	1693	-	-	-	-	-
Stage 2	608	-	-	-	-	-
Critical Hdwy	5.74	7.14	5.34	-	-	-
Critical Hdwy Stg 1	6.64	-	-	-	-	-
Critical Hdwy Stg 2	6.04	-	-	-	-	-
Follow-up Hdwy	3.82	3.92	3.12	-	-	-
Pot Cap-1 Maneuver	64	257	173	-	-	-
Stage 1	89	-	-	-	-	-
Stage 2	461	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	58	257	173	-	-	-
Mov Cap-2 Maneuver	58	-	-	-	-	-
Stage 1	81	-	-	-	-	-
Stage 2	461	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	74.7	0.3	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	173	-	58	257	-	-
HCM Lane V/C Ratio	0.094	-	0.543	0.114	-	-
HCM Control Delay (s)	28	-	124.8	20.8	-	-
HCM Lane LOS	D	-	F	C	-	-
HCM 95th %tile Q(veh)	0.3	-	2.2	0.4	-	-

HCM 6th TWSC
8: Circle K Driveway & Continental Drive

08/15/2019

Intersection												
Int Delay, s/veh	1.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	128	19	12	92	12	8	0	17	7	0	0
Future Vol, veh/h	0	128	19	12	92	12	8	0	17	7	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	139	21	13	100	13	9	0	18	8	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	113	0	0	160	0	0	283	289	150	292	293	107
Stage 1	-	-	-	-	-	-	150	150	-	133	133	-
Stage 2	-	-	-	-	-	-	133	139	-	159	160	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1476	-	-	1419	-	-	669	621	896	660	618	947
Stage 1	-	-	-	-	-	-	853	773	-	870	786	-
Stage 2	-	-	-	-	-	-	870	782	-	843	766	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1476	-	-	1419	-	-	664	615	896	642	612	947
Mov Cap-2 Maneuver	-	-	-	-	-	-	664	615	-	642	612	-
Stage 1	-	-	-	-	-	-	853	773	-	870	778	-
Stage 2	-	-	-	-	-	-	861	774	-	826	766	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.8			9.6			10.7		
HCM LOS							A			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	806	1476	-	-	1419	-	-	642
HCM Lane V/C Ratio	0.034	-	-	-	0.009	-	-	0.012
HCM Control Delay (s)	9.6	0	-	-	7.6	0	-	10.7
HCM Lane LOS	A	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

HCM 6th TWSC
8: Circle K Driveway & Continental Drive

08/15/2019

Intersection												
Int Delay, s/veh	1.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	139	19	10	165	23	17	0	20	17	0	0
Future Vol, veh/h	0	139	19	10	165	23	17	0	20	17	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	151	21	11	179	25	18	0	22	18	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	204	0	0	172	0	0	376	388	162	387	386	192
Stage 1	-	-	-	-	-	-	162	162	-	214	214	-
Stage 2	-	-	-	-	-	-	214	226	-	173	172	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1368	-	-	1405	-	-	581	547	883	572	548	850
Stage 1	-	-	-	-	-	-	840	764	-	788	725	-
Stage 2	-	-	-	-	-	-	788	717	-	829	756	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1368	-	-	1405	-	-	577	542	883	554	543	850
Mov Cap-2 Maneuver	-	-	-	-	-	-	577	542	-	554	543	-
Stage 1	-	-	-	-	-	-	840	764	-	788	718	-
Stage 2	-	-	-	-	-	-	781	711	-	809	756	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.4			10.4			11.7		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	710	1368	-	-	1405	-	-	554
HCM Lane V/C Ratio	0.057	-	-	-	0.008	-	-	0.033
HCM Control Delay (s)	10.4	0	-	-	7.6	0	-	11.7
HCM Lane LOS	B	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

HCM 6th TWSC
11: Continental Drive & West Access

08/15/2019

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	119	88	12	28	0
Future Vol, veh/h	0	119	88	12	28	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	129	96	13	30	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	109	0	-	0	232
Stage 1	-	-	-	-	103
Stage 2	-	-	-	-	129
Critical Hdwy	4.12	-	-	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	2.218	-	-	-	3.518
Pot Cap-1 Maneuver	1481	-	-	-	756
Stage 1	-	-	-	-	921
Stage 2	-	-	-	-	897
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1481	-	-	-	756
Mov Cap-2 Maneuver	-	-	-	-	756
Stage 1	-	-	-	-	921
Stage 2	-	-	-	-	897

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1481	-	-	-	756
HCM Lane V/C Ratio	-	-	-	-	0.04
HCM Control Delay (s)	0	-	-	-	10
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

HCM 6th TWSC
11: Continental Drive & West Access

08/15/2019

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	141	147	35	17	0
Future Vol, veh/h	0	141	147	35	17	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	153	160	38	18	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	198	0	-	0	332 179
Stage 1	-	-	-	-	179 -
Stage 2	-	-	-	-	153 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1375	-	-	-	663 864
Stage 1	-	-	-	-	852 -
Stage 2	-	-	-	-	875 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1375	-	-	-	663 864
Mov Cap-2 Maneuver	-	-	-	-	663 -
Stage 1	-	-	-	-	852 -
Stage 2	-	-	-	-	875 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1375	-	-	-	663
HCM Lane V/C Ratio	-	-	-	-	0.028
HCM Control Delay (s)	0	-	-	-	10.6
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1



**TRAFFIC IMPACT ANALYSIS
CONTINENTAL MIXED USE
CONTINENTAL DRIVE/SCOTTSDALE ROAD**

APPENDIX

Turn Lane Calculations

Un-Signalized Intersection (Right Turn Lane)

Location: North Access/Scottsdale Road

Approach/Leg: Southbound

2019 With Project

V = vehicles per hour

PM Peak Hour

V = 48 vph

S = Storage = $(V * 2 \text{ min} * 25 \text{ ft/veh}) / 60 \text{ min/hr}$

$$S \text{ (ft)} = \frac{48 \text{ vph} * (2 \text{ min}) * (25 \text{ ft/veh})}{(60 \text{ min/hr})} = 40 \text{ feet}$$

Minimum Recommended Storage: 50 feet

Un-Signalized Intersection (Left Turn Lane)

Location: North Access/Scottsdale Road

Approach/Leg: Eastbound

2019 With Project

V = vehicles per hour

PM Peak Hour

V = 29 vph

S = Storage = $(V * 2 \text{ min} * 25 \text{ ft/veh}) / 60 \text{ min/hr}$

$$S \text{ (ft)} = \frac{29 \text{ vph} * (2 \text{ min}) * (25 \text{ ft/veh})}{(60 \text{ min/hr})} = 24 \text{ feet}$$

Minimum Recommended Storage: 25 feet



**TRAFFIC IMPACT ANALYSIS
CONTINENTAL MIXED USE
CONTINENTAL DRIVE/SCOTTSDALE ROAD**

APPENDIX

Crash Data

CITY OF SCOTTSDALE

'13 -'14 COLLISION SUMMARY

REPORT #	DATE YYMMDD	TIME HHMM	NORTH / SOUTH ST.	TYPE	EAST WEST ST.	TYPE	DIR FROM	DIST FROM	INJ. SEV. #1 #2	PHYS. COND. #1 #2	VIOLATION #1 #2	ACTION #1 #2	TRAV. DIR. #1 #2	MANNER OF COLLISION	COMMENTS
13-13585	130612	1558	SCOTTSDALE	RD	CONTINENTAL		N	300	1 1	0 0	2 1	2 3	SB SB	4	
13-02417	130201	0741	SCOTTSDALE	RD	CONTINENTAL	DR	W	175	1 1	0 0	97 1	4 1	NB EB	3	
14-27439	141220	1144	SCOTTSDALE	RD	CONTINENTAL	DR	AT		1 1	0 0	2 1	1 3	SB NB	4	
13-25888	131110	0311	SCOTTSDALE	RD	ROOSEVELT	ST	AT		1	4	2	1	NB	1	DUI
13-04498	130224	1514	SCOTTSDALE	RD	ROOSEVELT	ST	AT		1 1	0 0	16 1	5 97	SB SB	2	CAR/BICYCLE
13-08253	130410	1542	SCOTTSDALE	RD	ROOSEVELT	ST	N	617	1 1	0 0	2 1	1 2	SB SB	4	
13-10868	130509	1709	SCOTTSDALE	RD	ROOSEVELT	ST	N	350	1 1	0 0	2 1	1 5	SB SB	4	MULTI VEH 3
13-15571	130709	0802	SCOTTSDALE	RD	ROOSEVELT	ST	N	400	3	0	2	7	NB	1	
13-16585	130721	2020	SCOTTSDALE	RD	ROOSEVELT	ST	AT		1 1	0 0	6 1	1 4	SB WB	5	
13-18688	130816	1542	SCOTTSDALE	RD	ROOSEVELT	ST	AT		2 1	0 0	7 1	4 1	SB NB	2	
13-25712	131108	1203	SCOTTSDALE	RD	ROOSEVELT	ST	AT		1 2	0 0	6 1	1 1	SB WB	2	
13-26906	131122	1134	SCOTTSDALE	RD	ROOSEVELT	ST	AT		1 1	0 0	7 1	4 1	NB WB	5	HIT AND RUN
13-29585	131223	1451	SCOTTSDALE	RD	ROOSEVELT	ST	AT		1 1	0 0	2 1	1 3	NB NB	4	MULTI VEH 5
14-03254	140209	0135	SCOTTSDALE	RD	ROOSEVELT	ST	AT		1 1	0 0	12 1	8 1	SB SB	6	
14-03615	140213	1415	SCOTTSDALE	RD	ROOSEVELT	ST	AT		1 1	0 0	99 99	5 6	NB NB	4	
14-16014	140725	1600	SCOTTSDALE	RD	ROOSEVELT	ST	N	400	1 1	0 0	1	13 1	WB NB	2	
14-17573	140815	1756	SCOTTSDALE	RD	ROOSEVELT	ST	AT		4 3	0 0	97 99	4 1	EB NB	3	
14-18000	140821	0757	SCOTTSDALE	RD	ROOSEVELT	ST	AT		1 1	0 0	2 1	1 2	NB NB	4	
14-20335	140920	1413	SCOTTSDALE	RD	ROOSEVELT	ST	AT		1 1	0 0	7 1	4 1	WB SB	3	
13-19436	130825	1446	SCOTTSDALE	RD	ROOSEVELT	ST	AT		1	0	2	5	NB	1	CAR/TREE

REPORT #	DATE TIME YYMMDD HHMM	NORTH / SOUTH ST.	TYPE	EAST WEST ST.	TYPE DIR FROM FROM	DIST FROM	INJ. SEV.		PHYS. COND.		VIOLATION		ACTION		TRAV. DIR.		MANNER OF COLLISION	COMMENTS
							#1	#2	#1	#2	#1	#2	#1	#2	#1	#2		

KEY

INJURY SEVERITY: 1=NO INJURY, 2=POSSIBLE INJURY, 3=NON-INCAPACITATING INJURY, 4=INCAPACITATING INJURY, 5=FATAL INJURY, 99=NOT REPORTED / UNKNOWN

PHYSICAL CONDITION: 0=NO APPARENT INFLUENCE, 1=ILLNESS, 2=PHYSICAL IMPAIRMENT, 3=FELL ASLEEP / FATIGUED 4=ALCOHOL, 5=DRUGS, 6=MEDICATIONS, A=NO TEST GIVEN, B=TEST GIVEN, C=TEST REFUSED, D=TESTING UNKNOWN, 97=OTHER, 99=UNKNOWN

VIOLATION: 1=NO IMPROPER ACTION, 2=SPEED TOO FAST FOR CONDITIONS, 3=EXCEEDED LAWFUL SPEED 4=FOLLOWED TOO CLOSELY. 5=RAN STOP SIGN, 6=DISREGARDED TRAFFIC SIGNAL 7=MADE IMPROPER TURN, 8=DROVE/RODE IN OPPOSING TRAFFIC LANE, 9=KNOWINGLY OPERATED WITH FAULTY / MISSING EQUIPMENT, 10=REQUIRED MOTORCYCLE SAFETY EQUIPMENT NOT USED, 11=PASSED IN NO PASSING ZONE, 12=UNSAFE LANE CHANGE, 13=FAILED TO KEEP IN PROPER LANE, 14=DISREGARDED PAVEMENT MARKINGS, 15=OTHER UNSAFE PASSING, 16=INATTENTION/DISTRACTION, 17=DID NOT USE CROSSWALK, 18=WALKED ON WRONG SIDE OF ROAD, 19=ELECTRONIC COMMUNICATIONS DEVICE, 20=FAILED TO YIELD RIGHT OF WAY (added August 2014), 97=OTHER, 99 UNKNOWN

ACTION: 1=GOING STRAIGHT AHEAD, 2=SLOWING IN TRAFFICWAY, 3=STOPPED IN TRAFFICWAY, 4=MAKING LEFT TURN, 5=MAKING RIGHT TURN, 6=MAKING U-TURN, 7=OVERTAKING/PASSING, 8=CHANGING LANES, 9=NEGOTIATING A CURVE, 10=BACKING, 11=AVOIDING VEH/OBJ/PED/CYCLIST/ANIMAL, 12=ENTERING PARKING POSITION, 13=LEAVING PARKING POSITION, 14=PROPERLY PARKED, 15=IMPROPERLY PARKED, 16=DRIVERLESS MOVING VEHICLE, 17=CROSSING ROAD, 18=WALKING WITH TRAFFIC, 19=WALKING AGAINST TRAFFIC, 20=STANDING, 21=LYING, 22=GETTING ON OR OFF VEHICLE, 23=WORKING ON/PUSHING VEHICLE, 24=WORKING ON ROAD, 97=OTHER, 99=UNKNOWN

MANNER OF COLLISION: 1=SINGLE VEHICLE, 2=ANGLE (front to side, other than left turn), 3=LEFT TURN, 4=REAR END (front to rear), 5=HEAD-ON (front to front, other than left turn), 6=SIDESWIPE (same direction), 7=SIDESWIPE (opposite direction), 8=REAR-TO-SIDE, 9=REAR TO REAR, 97=OTHER, 99=UNKNOWN

TOTAL 20

CITY OF SCOTTSDALE

'15 -'16 COLLISION SUMMARY

REPORT #	DATE YYMMDD	TIME HHMM	NORTH / SOUTH ST.	TYPE	EAST WEST ST.	TYPE	DIR FROM	DIST FROM	INJ. SEV. #1 #2	PHYS. COND. #1 #2	VIOLATION #1 #2	ACTION #1 #2	TRAV. DIR. #1 #2	MANNER OF COLLISION	COMMENTS					
16-01258	160116	1536	SCOTTSDALE	RD	CONTINENTAL	RD	AT		1	0		5	NB	1						
16-26466	161127	1513	SCOTTSDALE	RD	CONTINENTAL		AT		1	1	0	0	20	1	6	1	NB	NB	97	
15-05170	150304	0127	SCOTTSDALE	RD	ROOSEVELT	ST	AT		1	1	4	0	20	1	4	1	NB	SB	3	DUI
15-05550	150308	1009	SCOTTSDALE	RD	ROOSEVELT	ST	AT		3		0		1		2		SB		1	
15-05803	150311	1614	SCOTTSDALE	RD	ROOSEVELT	ST	AT		99	99	99	0	2	1	1	3	NB	NB	4	HIT AND RUN
15-07873	150405	1247	SCOTTSDALE	RD	ROOSEVELT	ST	AT		3	1	99	0	6	1	17	1	SB	EB	2	CAR/BICYCLE
15-21544	151003	0231	SCOTTSDALE	RD	ROOSEVELT	ST	AT		1		4	0	13	1	1	14	SB		5	HIT AND RUN
15-04786	150227	0617	SCOTTSDALE	RD	ROOSEVELT	ST	AT		1	1	4	0	7	1	4	1	EB	NB	3	DUI, HIT AND RUN
16-13083	160606	1835	SCOTTSDALE	RD	ROOSEVELT	ST	AT		1	1	0	0	20	1	4	1	EB	NB	8	
16-15585	160709	1105	SCOTTSDALE	RD	ROOSEVELT	ST	AT		2	2	0	0	2	1	1	3	SB	SB	4	MULTI VEH 4
16-20025	160906	1431	SCOTTSDALE	RD	ROOSEVELT	ST	AT		1		0		1		1		SB		97	
16-16881	160728	1026	SCOTTSDALE	RD	ROOSEVELT	ST	N	20	1	1	0	0	4	1	1	3	SB	SB	4	
16-20085	160907	1111	SCOTTSDALE	RD	ROOSEVELT	ST	E	60	1	1	99	0	8	1	5	3	EB	WB	5	
16-12973	160605	1051	SCOTTSDALE	RD	ROOSEVELT	ST	N	300	1		0		13		1		SB		1	
16-28443	161220	1647	SCOTTSDALE	RD	ROOSEVELT	ST	N	359	1	4	0	0	20	1	4	1	EB	NB	3	
16-13179	160607	2050	SCOTTSDALE	RD	ROOSEVELT	ST	N	404	2	3	4	0	20	1	6	1	EB	NB	2	DUI
16-00437	160106	1339	SCOTTSDALE	RD	ROOSEVELT	ST	N	675	4	4	4	0	2	12	1	17	SB	SB	4	DUI, CAR/BICYCLE

REPORT #	DATE YYMMDD	TIME HHMM	NORTH / SOUTH ST.	TYPE	EAST WEST ST.	TYPE DIR FROM FROM	DIST FROM	INJ. SEV. #1 #2	PHYS. COND. #1 #2	VIOLATION #1 #2	ACTION #1 #2	TRAV. DIR. #1 #2	MANNER OF COLLISION	COMMENTS
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KEY

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TOTAL 17

CITY OF SCOTTSDALE

'17 -'18 COLLISION SUMMARY

REPORT #	DATE YYMMDD	TIME HHMM	NORTH / SOUTH ST.	TYPE	EAST WEST ST.	TYPE	DIR FROM	DIST FROM	INJ. SEV. #1 #2	PHYS. COND. #1 #2	VIOLATION #1 #2	ACTION #1 #2	TRAV. DIR. #1 #2	MANNER OF COLLISION	COMMENTS
1715987	170718	2130	SCOTTSDALE	RD	CONTINENTAL	ST	AT		1 1	99 0	2 1	1 3	SB SB	4	
1807578	180404	2139	SCOTTSDALE	RD	ROOSEVELT	ST	AT		1 2	0 0	97 1	4 17	EB SB	1	CAR/PEDESTRIAN
1728551	171227	0930	SCOTTSDALE	RD	ROOSEVELT	ST	AT		1 1	0 0	6 1	1 1	SB WB	2	
1728061	171219	1608	SCOTTSDALE	RD	ROOSEVELT	ST	AT		1 1	0 0	20 1	4 1	WB SB	2	MULTI VEH 3
1719793	170907	0731	SCOTTSDALE	RD	ROOSEVELT	ST	AT		1	99 0	99 1	1 2	NB NB	4	HIT AND RUN
1712249	170531	0626	SCOTTSDALE	RD	ROOSEVELT	ST	AT		1 1	0 0	1 1	4 17	NB NB	1	
1709969	170502	2126	SCOTTSDALE	RD	ROOSEVELT	ST	AT		1 1	0 0	20 1	4 1	WB EB	2	
1705058	170303	1414	SCOTTSDALE	RD	ROOSEVELT	ST	AT		1	99	97	10	WB	1	HIT AND RUN
1700106	170102	1300	SCOTTSDALE	RD	ROOSEVELT	ST	AT		1 3	0 0	6 1	1 1	EB NB	2	
1718544	170821	1847	SCOTTSDALE	RD	ROOSEVELT	ST	N	35	99 1	99 0	20 1	1 1	SB SB	4	HIT AND RUN
1710507	170509	1242	SCOTTSDALE	RD	ROOSEVELT	ST	N	150	99 1	99 0	12 1	8 1	NB NB	97	HIT AND RUN
1717756	170811	1308	SCOTTSDALE	RD	ROOSEVELT	ST	N	200	1 1	0 0	97 1	10 1	NB NB	4	

REPORT #	DATE YYMMDD	TIME HHMM	NORTH / SOUTH ST.	TYPE	EAST WEST ST.	TYPE	DIR	DIST	INJ. SEV.	PHYS. COND.	VIOLATION	ACTION	TRAV. DIR.	MANNER OF COLLISION	COMMENTS	
							FROM	FROM	#1	#2	#1	#2	#1	#2	#1	#2

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TOTAL 12



**TRAFFIC IMPACT ANALYSIS
CONTINENTAL MIXED USE
CONTINENTAL DRIVE/SCOTTSDALE ROAD**

APPENDIX

Comment Resolution



**Continental Mixed Use
TIA Dated 17 December 2018
Comment Resolution**

8/16/2019

Item No.	Page No.	Reviewer	Code	Comment	Response
City of Scottsdale					
1	General	Greg Bloomberg	D	The updated TIMA now includes a description and analysis of all proposed access points however, it unrealistically projects low trips through the west driveway on Continental Drive, roughly 1/9th the volume of the east driveway, even through the site plan indicates more parking spaces on the lower level in closer proximity to the west driveway. Please clarify.	Site assignment has been revised.

A - Will Revise
 B - Consultant to Evaluate
 C - City to Evaluate
 D - See Response



**Continental Mixed Use
TIA Dated 8 June 2018
Comment Resolution**

12/17/2018

Item No.	Page No.	Reviewer	Code	Comment	Response
City of Scottsdale					
1	12	Greg Bloemberg	A	The trip generation estimate includes values for the existing auto dealership based on Gross Floor Area (GFA). The GFA used in the report includes an area representing the entire parcel. The estimate should be revised to reflect only the GFA of the sales office, or another method used to estimate the existing trips. Preferably, 24-hour driveway counts at all driveways serving the existing use should be gathered to estimate the actual trips generated by the site.	Trip generation comparison has been updated for the existing automobile dealership to only include the indoor sales and service areas based on ITE LUC 840.
2	General	Greg Bloemberg	A	The TIMA analyzes and describes two access driveways; however, the site plan shows three access points (One on Scottsdale and two on Continental). Please update the report to include all three access points.	West Access has been added to the analysis.
3	6	Greg Bloemberg	A	The site plan doesn't show the locations of existing driveways/alleys on the south side of Continental Drive. As such, staff was un able to accurately review the proposed Continental Drive site access points in relation to the existing driveway and alley across the street. The proposed driveways should align with the access points across Continental, or if skewed, be placed so vehicles making opposing left turns aren't positioned to increase the potential for head-on collisions if both east and west-bound vehicles make left turns simultaneously.	Site plan has been updated to show south side of Continental Drive.

A - Will Revise
B - Consultant to Evaluate
C - City to Evaluate
D - See Response